

K3S and K3 Firmware Information

NOTE: Beginning with revision 5.26, the K3 and K3S transceivers share the same firmware. Both use *K3 Utility* for firmware loading.

K3 MCU 5.67 / DSP 2.88 / FPF 1.26, 1-22-2019

*** 6 M GAIN REDUCTION (FOR USE WITH KPA3A):** In some cases the KPA3A may have more gain than necessary on 6 meters. As a precaution, all radios using a KPA3A (instead of the older KPA3) should be configured to insert some attenuation. See instructions below. No hardware modifications are required.

INSTRUCTIONS: [Do this only on a K3S, or a K3 that has a KPA3A installed.]

1. Select the 6 meter band.
2. Connect a dummy load rated at 50 W (or higher) to the transceiver.
3. Set the PWR control to 50 watts.
4. Place the ATU in bypass mode.
5. Locate the CONFIG:TUN PWR menu entry. Set the value to NOR using VFO A.
6. Locate the CONFIG:TXGN HP menu entry.
7. Tap the '8' switch (NR) once to add "ATN6" to the parameter display on VFO A.
(Tapping it a second time would return to the original non-attenuated setting.)
8. Exit the menu.
9. Hold TUNE to do automatic power calibration on 6 meters at the 50 W level. After a few seconds, tap XMIT to terminate the TUNE operation.

NOTE: If you have difficulty reaching full power on 6 meters after making this change, it could be because your PA module is actually a KPA3, not a KPA3A. In this case, re-do the above procedure, changing the TXGN HP menu setting back to the original (i.e., without "ATN6" showing). (Max. power output at 50 MHz is specified at 100 W +/- 1 dB, typical. 1 dB below 100 W is approx. 90 W. See Specifications for max output at 51 MHz and higher.)

*** T/R TIMING IMPROVED.** Adds more margin during KPA3A TX sequencing.

K3 MCU 5.66 / DSP 2.88 / FPF 1.26, 11-28-2018

*** ADDED SWR READ COMMAND:** "SW;" returns the most recent SWR reading in transmit or TUNE mode, e.g. "SW023;" for an SWR of 2.3:1. Max value returned is "SW99;" (SWR = 99.9:1).

K3 MCU 5.64 / DSP 2.88 / FPF 1.26, 2-22-2018

*** RCV MODE "HI CUR" THRESHOLD CHANGED:** The threshold at which "HI CUR" (excessive current drain) warnings appear in receive mode has been increased. Some users with all options enabled (including the sub receiver, internal transverter, and K-Pod) were seeing spurious HI-CUR warnings and disabling of one speaker channel.

K3 MCU 5.63 / DSP 2.88 / FPF 1.26, 11-22-2017

*** KPA1500 ATU TUNE INTEGRATION:** When used with a K3/K3S and the ACC cable, the KPA1500 completely controls ATU TUNE, requiring just a single switch tap. The amplifier automatically starts/stops TUNE mode at the K3.

K3 MCU 5.62 / DSP 2.88 / FPF 1.26, 11-16-2017

*** NEW CONTROL COMMAND ("TM"):** The TM command sets or reads the transmit metering mode on the LCD. **TM0;** sets the bar graph for SWR/RF, while **TM1;** sets the bar graph for CMP/ALC. The TX metering mode also determines what is read by the BG (bar graph read) command during transmit. With TM0 in effect, BG reads the power level. If TM1 is in effect, BG reads the ALC level.

K3 MCU 5.61 / DSP 2.88 / FPF 1.26, 6-5-2017

*** HOST & P3 UPDATED ON MODE CHANGES** due to A/B swap, REV, ALT, etc.).

K3 MCU 5.60 / DSP 2.88 / FPF 1.26, 5-15-2017

*** K-POD AND MACRO BUG FIX:** Fixed bug that was causing occasional loss of macro commands, activated either with a K3 front-panel switch or the K-Pod.

*** NEW CONTROL COMMAND (DE):** The DE remote-control command inserts a command processing delay of about 10 to 2550 ms. This is useful in switch or K-pod macros, where a delay may be desired to allow the radio to complete a previous operation (such as band change or CW message send) before the next command is processed. The format of the command is DE \langle nnn \rangle ; where \langle nnn \rangle can be 001-255. This value represents the delay in 10 ms increments. **Note:** A value of 001 may result in a delay shorter than 10 ms, while 002 is guaranteed to provide a delay between 10 and 20 ms, etc.

K3 MCU 5.59 / DSP 2.88 / FPF 1.26, 5-11-2017

*** POWER CONTROL BUG FIX:** PWR control adjustment was sometimes enabling the TX carrier, so that tapping XMIT afterward would result in

unexpected RF output. (Any subsequent transmit operation, e.g. another tap of XMIT, would clear the condition. For this reason the problem was rarely observed.)

K3 MCU 5.58 / DSP 2.88 / FPF 1.26, 3-16-2017

*** PREAMP 2 (ON KXV3B) NOW USABLE ON 15 AND 17 M:** PREAMP 2 improves noise figure by about 6 dB on 15 m and 3 dB on 17 m relative to PREAMP 1.

*** TX LINE OUT (MONITOR) LEVEL NOW ADJUSTABLE:** In CONFIG:LIN OUT menu entry, tap '2' (REV switch) to set the "T=" level (TX monitor). Tap '2' again to return to the RX LINE OUT setting.

*** K-POD SWITCHES WORK CORRECTLY FOR MESSAGE PLAY:** K-Pod switch tap and hold can now be used to play, chain, or repeat messages programmed into the K3's M1-M4 message buffers. For example, if macros 9 and 10 were set up as "SWT21;" and "SWT31;" using K3 Utility, then tapping K-Pod switches F1 and F2 would trigger messages M1 and M2, respectively.

*** AM SYNC BUG DURING MEMORY RECALL/STORE FIXED:** Previously, recalling or storing a memory with AM-S/TRACK selected could cause the displayed memory number to change on VFO B.

*** QSK/VOX DELAY NOT APPLIED IN VOX MODE IF TX START/STOP IS VIA PTT OR XMIT SWITCH:** When VOX is selected for any operating mode, the selected delay (set by the DELAY control) is applied on exit from transmit. Now, if the operator starts/stops transmit via PTT or the transmit switch with VOX selected, no delay is applied.

For software developers:

*** VOX SET HOST COMMAND ADDED:** VX_n where n = 0 for OFF, n = 1 for ON. CW VX setting is separate from voice/data modes.

*** RX ANTENNA HOST COMMAND ADDED:** AR_n where n = 0 for RXANT OFF, n = 1 for ON.

K3 MCU 5.57 / DSP 2.88 / FPF 1.26, 2-16-2017

*** FASTER RESPONSE TO HIGH REFLECTED POWER:** The transceiver will now reduce drive more quickly when transient conditions cause excessive reflected power. This roll-back response does not change the set power level (PWR knob); instead, it reduces the drive to get below the reflected power limit. This means that once a better match is restored (such as when using an antenna tuner), the set power level will automatically be restored.

K3 MCU 5.56 / DSP 2.88 / FPF 1.26, 10-26-2016

*** SCANNING WORKS WITH FREQUENCIES BELOW 1.0 MHz:** Previously, scanning would stall in this case.

*** REDUCED K-POD MACRO FLASH TIME:** If text decode is enabled, then the length of time that K-Pod macro names are flashed is greatly reduced. This reduces the obstruction of text shown on VFO B.

*** DT, FR, and FT HOST COMMANDS DISALLOWED IN TX MODE:** Previously, these commands could be sent to the K3 during transmit from some software applications. This could cause side effects such as muting of transmit audio in DATA modes.

K3 MCU 5.55 / DSP 2.88 / FPF 1.26, 10-20-2016

*** KPOD WORKS IN REMOTE-RIG TERMINAL MODE:** The K-Pod will now function correctly with a K3 or K3/0-mini being used as a remote-rig terminal. Basic functions of the K-Pod can be used, including switch tap / hold and VFO A/B/offset control. LEDs and AUX outputs of the terminal K-Pod are not yet supported. **Note:** At present, when switches on the terminal K-Pod are used, they will execute macros stored at the *remote* K3. This will be apparent when macro names are flashed on VFO B.

K3 MCU 5.54 / DSP 2.88 / FPF 1.26, 9-24-2016

*** FLASH MEMORY INTERFACE UPDATED:** Improved robustness of read/verify operations between the MCU and flash IC.

*** POWER-ON CHECK OF ADC REF MENU PARAMETER:** If the value of CONFIG:ADC REF is out of range, it is reset to 5.00 V to ensure useful accuracy of voltage and current displays, etc.

K3 MCU 5.53 / DSP 2.88 / FPF 1.26, 8-24-2016

*** VFO B TUNE VIA K-POD OVERRIDES K3 ALTERNATE DISPLAYS:** If you use the VFO B tuning function of the K-Pod while the K3 has an alternate display showing (via the DISP switch), the VFO B frequency will be displayed instead, as long as you keep tuning it. This is especially useful for operators who keep a VFO B alternate display showing at all times, such as RIT/XIT offset, time, date, supply voltage, etc.

K3 MCU 5.52 / DSP 2.88 / FPF 1.26, 8-11-2016

*** K-POD LED AND AUX OUTPUT CONTROL:** K-Pod LEDs and AUX outputs can now be controlled directly from K3 macros using the KPLED-nON|OFF and KPOUTnON|OFF commands. See examples in latest K-Pod owner's manual.

K3 MCU 5.51 / DSP 2.88, 7-16-2016

*** TX MONITOR to LINE OUT:** Transmit monitor audio (voice or sidetone) is now available at LINE OUT. At present the level is fixed. A future release will allow adjustment.

K3 MCU 5.50 / DSP 2.87, 5-17-2016

* **K-POD BUG FIX:** Eliminated "ERR KP1" messages (K-Pod parity errors) that were occurring when the K-Pod knob was spun at the same time the P3 was used, along with heavy external polling from HRD, etc.

K3 MCU 5.49 / DSP 2.87, 4-10-2016

* **K-POD SUPPORT:** Reads switch and encoder events from an Elecraft K-Pod attached to the RJ12 jack under the K3/K3S front panel. F1-F8 tap on the K-Pod execute macros 9-16; F1-F8 hold execute macros 1-8. Use the latest K3 Utility to set up macros and write them to the K3/K3S.

K3 MCU 5.47 / DSP 2.87 / FPF 1.25, 3-1-2016

* **15/17 M POWER OUTPUT FIXED:** No longer limited to 95 W on these bands.

* **DSP LINE OUT CONTROLS:** Further description TBD.

K3 MCU 5.46 / DSP 2.86 / FPF 1.25, 1-8-2016

* **IMPROVED T/R CONTROL FROM SOFTWARE APPLICATIONS:** Some computer logging/contesting applications send an "RX;" command to exit transmit mode (e.g. N1MM, when ESC is pressed). This now works reliably even if transmit was initiated via PTT or any other method. **Note:** If an application sends "RX;" substantially *before* dropping the PTT line, the radio will still return to receive, but the user will see ERR PTT on VFO B and further transmit will be locked out until PTT is released. Similarly, if "RX;" is sent while external KEY input is still present, ERR KEY will be shown on VFO B, and transmit locked out until KEY in is released.

* **KRX3 support:** Firmware detects latest KRX3 PCB (rev. C), which uses a different type of IC for selecting crystal filters. (No performance difference from older revisions.)

K3 MCU 5.40 / DSP 2.86 / FPF 1.25, 11-11-2015

* **PA TEMP MENU FUNCTION CHANGE:** Tapping '1' in CONFIG:PA TEMP selects one of two PA temperature-sensing algorithms for use on 12 and 10 m: "T AND R" or "R ONLY". The default is "T AND R" (normal 12/10 m PA temp sensing in both TX and RX modes). The "R ONLY" selection should be used if PA temperature sensing on these higher bands may be affected by higher load SWR, poor grounding, or supply voltage drop. In this case, normal temp sensing is done only in RX mode, while in TX mode, sensing is done in a way that minimizes sensor error due to RFI. 6 meters always uses the R ONLY method.

K3 MCU 5.38 / DSP 2.86 / FPF 1.25, 10-3-2015

* **CR & LF NOW HANDLED IN FSK-D and PSK-D MODES:** Carriage return (CR) and line feed (LF) characters are now correctly handled in FSK-D and PSK-D modes, for both receive and transmit. These are used by computer applications (such as the K3 Utility Terminal screen) for screen formatting,

etc. FSK-D and PSK-D are the transceiver's built-in data modes, allowing the operator to send using a keyer paddle, a keyboard connected to the P3 panadapter, or a computer application. Decoded text is also scrolled on the radio's VFO B display.

*** ELIMINATED UNEXPECTED ERR PTT/ERR KEY MESSAGES:**

Operators were finding that when they held the mic PTT switch, then tapped certain switches including A/B, they were seeing ERR PTT/ERR KEY messages. Such messages now appear only if the PTT/KEY inputs on the RS232 or USB connectors are in use (see CONFIG:PTT-KEY), and the user tries to exit a transmit condition by tapping XMIT.

K3 MCU 5.35 / DSP 2.86 / FPF 1.24, 8-20-2015

*** MAIN:ATTEN MENU ENTRY NO LONGER GETS SET TO 0**

DB: This menu entry sets the per-band attenuator **ON** level (5, 10, or 15 dB for the K3S, 10 dB fixed for the K3). In the previous firmware release, MAIN:ATTEN could be set to 0 dB by computer logging/control applications. This is not a valid parameter value. Once the menu entry is set to the desired ON value, the attenuator itself is turned on/off by the ATT switch. (Holding ATT for 3 seconds is a shortcut into the menu entry.)

For Application Developers:

*** "RA01" and "RA10" COMMANDS BOTH SELECT 10-dB RX**

ATTN VALUE: The K3's RA set command for 10 dB is **RA01**. The K3S uses actual dB values, so for 10 dB, **RA10** is normally used. (The K3S can also accept RA05 and RA15.) To improve compatibility with unmodified K3 applications, the K3S now allows either **RA01** or **RA10** for 10 dB. The GET response uses whichever SET format was received last.

MCU 5.33 / DSP 2.86 / FPF 1.23, 8-3-2015

*** DIVERSITY WORKS WITH MISMATCHED MAIN/SUB RX**

FILTERS: Diversity mode in the K3S (or a K3 with the KSYN3A installed) now works with any combination of main/sub RX crystal filters. They can have different bandwidths or offsets, and it's not necessary to have an equal number of filters in each receiver. **Note:** Matched filters are optimal for diversity, but non-matched filters will still perform well.

*** PTT/KEY USE WITH THE USB PORT IMPROVED:** PC applications can activate PTT and KEY at the K3S via the USB port's RTS/DTR signals. However, initial setup of the rig's USB port by the PC may cause pulsed or continuous activation of the transmitter. This can happen if the computer is turned on *after* the K3S, or if the USB cable is not connected. There is now a "Safe" mode (the default) which disables PTT-KEY transmit until the K3S receives a command via USB, such as a read of the rig's VFO frequency. **To turn on safe mode on/off**, go into CONFIG:PTT-KEY and tap '1' to select "USB SAFE" or "UNSAFE". Exit the menu and turn the K3S off/on. **Applications that use PTT-KEY via USB but never send commands**

may require "UNSAFE" mode. In this case, unwanted transmit can be avoided by turning the PC on *before* the K3S.

*** CANCELLING UNEXPECTED PTT-KEY ACTIVATION:** If an external source (usually a PC) activates PTT or KEY unexpectedly, you can cancel transmit by tapping the **XMIT** switch. This will show ERR KEY or ERR PTT on VFO B. Once the PTT or KEY source has been removed, transmit will be re-enabled. **If the cause may be unneeded PTT-KEY activation via the USB port**, go into the CONFIG:PTT-KEY menu entry and set the parameter to OFF-OFF.

For Application Developers (also see Programmer's Reference, rev. F2):

*** PARAMETER ADJUSTMENT VIA "UP" and "DN" COMMANDS:** UP and DN now apply to all settings adjusted using VFO A/B, including: NB, NR, manual notch, pitch, and text decode . (It also still applies to the menu.) It does NOT apply to special displays controlled by VFO B (use DB), or to settings controlled by the small encoders.

*** OM (OPTION MODULE) COMMAND CHANGES:** Three new single-letter fields have been added to the OM command: 'L' (low-noise amp/preamp2 available on present band), 'V' (KSYN3A installed, allowing the VFO to tune down to 100 kHz), and 'R' (K3S RF board in use; see impact on RA command, below). Note that 'L' (preamp 2) only applies on 12/10/6 meters. Preamp 2 is located on the new KXV3B module.

*** RA (ATTENUATOR) COMMAND FORMAT CHANGE:** If a K3S RF board is in use (determined using the OM command, above), the set/response format of the RA command uses dB values (RA00/05/10/15). The K3 format is still RA00/01. Note: 5 and 15 dB attenuator settings only apply to the main RX. The sub RX attenuator is 10 dB, even in the K3S. But if a K3S RF board is detected, the sub RX RA format is RA00/10.

MCU 5.29 / DSP 2.83 / FPF 1.22, 6-16-2015

*** EXTERNAL ALC DEFAULT FIXED:** External ALC (CONFIG:EXT ALC menu entry) was being set to ON at first-time power-up. It now correctly defaults to OFF. **Any K3S first powered-up with rev. 5.26 should be checked for the correct setting (normally done at the factory). Set to OFF unless external ALC is in use.**

*** ADC REFERENCE DEFAULT FIXED:** The A-to-D converter reference setting (CONFIG:ADC REF menu entry) was left uninitialized at first power-up, possibly with a value that could adversely affect the accuracy of power, SWR, and other readings. **Any K3S first powered-up with rev. 5.26 should have ADC REF recalibrated (normally done at the factory).**

MCU 5.28 / DSP 2.83 / FPF 1.22, 5-27-2015

*** Manufacturing support changes.**

MCU 5.26 / DSP 2.83 / FPF 1.22, 5-8-2015

(First Combined K3S/K3 Release)

*** USB COMPUTER PORT FOR COMBINED CONTROL and DIGITAL AUDIO (K3S, KIO3B):** If a KIO3B module is installed (standard with the K3S), the CONFIG:RS232 menu entry will have a "USB" setting. If this setting is used, then a single USB cable can be used between the K3S and a computer to provide remote control, digitized line-level audio in/out, and PTT/KEY (via equivalents to the "RTS" and "DTR" signals). All of these signals are usually recognized by computer applications that also support RS232. This eliminates the need for a sound card and associated analog line in/out cables, as well as any external converter units. Refer to the K3S owner's manual, pgs. 18-20, for details.

*** NEW P3 PANADAPTER CABLE SUPPORT (K3S, KIO3B):** If a KIO3B module is installed, then the P3 Panadapter must be connected to the K3S at its RS232/P3 connector (RJ45). Two different special cables are available for this purpose, depending on whether a computer will be connected via USB or RS232 to the K3S and P3. Refer to the K3S owner's manual for details (pg. 18 and 19).

*** LINE IN/OUT AUDIO USE WITH USB PORT (K3S, KIO3B):** If a plug is inserted into the LINE IN jack on the K3S, this audio signal will override the digitized audio line-in data that is present in the USB cable. LINE OUT on the K3S, however, is always available even if the USB cable is being used for line-out.

*** PREAMP 2 and CONFIG:PREAMP2 MENU ENTRY (KXV3B):** This menu entry is only applicable if a KXV3B module is installed (supplied with the K3S). It also only applies if the current band is 12, 10, or 6 meters. If PREAMP2 is set to ON, then the PRE switch rotates through settings of OFF, PRE 1, and PRE 2 on the applicable band. PRE 2 turns on the low-noise preamp on the KXV3B module (+20 dB, with a typical NF of -144 dBm on 12/10/6 meters). When PRE 2 is selected, the PRE icon will flash slowly. **Note:** Do not use an external preamplifier (such as an Elecraft PR6 or PR6-10) when using the built-in low-noise preamp (PRE 2). This would result in excessive gain.

*** MULTIPLE ATTENUATOR SETTINGS and MAIN:ATTEN MENU ENTRY (K3S RF BOARD):** On a K3S, the MAIN:ATTEN menu entry is used to select the per-band attenuation level for the ATTN switch (5/10/15 dB). A shortcut method of accessing this menu entry is to hold the ATTN switch for about 3 seconds. (On a K3, the parameter is fixed at 10 dB.)

*** LOW-LOSS ATU BYPASS SETTING (KAT3A):** The upgraded internal ATU option, the KAT3A, includes a very low-loss bypass path via an additional relay. The bypass relay is engaged when the ATU switch is used to turn the ATU icon OFF. This setting can be used with closely matched antennas. ("Bypass" mode on the earlier model KAT3 ATU uses a minimum-L/minimum-C network setting rather than a relay, result in a small dissipation loss that varies with frequency.)

*** 100-500 KHZ SENSITIVITY IMPROVEMENT (KBPF3A):** The KBPF3A is an upgrade from the KBPF3. The lowest-frequency filter in the KBPF3A has a cutoff at 100 kHz rather than 500 kHz. This improves typical sensitivity at 137 kHz (2200 meters) to about -120 dBm, and at 472 kHz (600 meters), about -130 dBm.

*** UPDATED "PA" (PREAMP) REMOTE-CONTROL COMMAND (KXV3B):** The PA command now supports a SET/RESPONSE value of "PA2" whenever preamp 2 is available. This applies on 12/10/6 meters with a KXV3B module installed and preamp 2 enabled (see CONFIG:PREAMP2 description, above).

MCU 5.22 / DSP 2.83 / FPF 1.21, 4-9-2015

* Noise blanker driver optimization: no effect on normal operation.

MCU 5.20 / DSP 2.83 / FPF 1.21, 3-30-2015

*** MENU IMPROVEMENTS:** (1) CONFIG:VFO LNK will now alternate between ON and OFF when assigned to a PFx or Mx switch. (2) The KNB3 is required for operating the radio, and there are no configuration settings, so this entry was removed. (3) Accessing menu entries via PFx/Mx switches now correctly restores the operator's last-used MAIN and CONFIG menu selections on exit.

*** VCO CAL (FOR KSYN3) DISABLED IF KSYN3A DETECTED.**

*** FA & FB REMOTE-CONTROL COMMANDS WORK DOWN TO 100 KHZ WITH KSYN3A.** Note that a KBPF3 module is required to use the K3 below 160 meters. Sensitivity is then quite good (-125 dBm) down to about 400 kHz, although it falls off below that. For example, 250 kHz MDS is about -90 dBm.

MCU 5.14 / DSP 2.83 / FPF 1.19, 2-26-2015

*** VCO CAL FIXED (NOT APPLICABLE TO KSYN3A):** The original KSYN3 synthesizer must be calibrated at time of assembly using CONFIG:VCO MD. This is once again working correctly.

*** DUAL PB CW FEATURE RESTORED:** The original DUAL PB (dual-passband) CW feature has been added back in. CONFIG:DUAL PB can be used to select either DUAL PB or APF (audio peaking filter). APF is the default. See manual for details.

*** 50-WATT TX GAIN CALIBRATION REQUIRED (ONE TIME):**

The first time *rev. 5.10 or later firmware* is loaded into the K3, 50-watt TX gain calibration should be performed on all bands. This is fully automated by K3 Utility. This initializes transmit drive limit data that is now used to prevent overdrive of the KPA3 amplifier.

MCU 5.13 / DSP 2.83 / FPF 1.19, 2-24-2015

*** KSYN3A CONTROL BUG FIXED:** On some K3s, a communications error would sometimes occur between the main MCU and KSYN3A, leading to either the main or sub receiver being off frequency. This has been corrected.

*** TURNING DIVERSITY OFF DOESN'T TURN OFF THE SUB RX:** This applies to both a hold of the SUB switch and the DV0 host command. The sub must be turned off by tapping SUB. (Also see next item.)

*** NEW "DVS" HOST COMMAND:** This variation of the DV command turns both diversity and the sub RX on/off at the same time. This is useful for operators who want a single switch macro to quickly alternate between sub with diversity ON and sub OFF. Use K3 Utility to create a switch macro, then assign it to a programmable switch using CONFIG:MACRO n.

*** "DT" HOST COMMAND FIX (data sub-mode):** The DT set command to select the DATA submode for VFO A now correctly sets the same submode for VFO B.

* RF board device driver updates. No effect on normal operation.

MCU 5.10 / DSP 2.83, 2-2-2015

*** EASIER DIVERSITY RECEIVE SELECTION:** A regular hold of SUB now goes directly into diversity receive, without first having to go through "LINK". This should benefit most users of the KRX3 sub receiver, since few use the VFO linking function. Those who do use VFO linking can still turn it on by setting CONFIG:VFO LNK to ON. This menu entry can be assigned to a programmable function switch for easy selection if desired, eliminating the need to bring up the menu. Note: Remote-control command "LN" is another way to accomplish VFO linking.

*** DIVERSITY-MODE FIX:** Diversity mode with mis-matched crystal filters was in some cases resulting in the main and sub receivers being offset.

*** PREAMP ICON FIX:** In some cases the "PRE" icon was left in the incorrect state.

*** REMOVED CONFIG:DUAL PB MENU ENTRY:** This menu entry isn't needed since the K3's original, idiosyncratic "DUAL PB" function for CW mode ("context/focus" filtering) is no longer supported. APF (audio peaking filter) was added later; it is far more effective and of greater utility. In conjunction with this, the DUAL PB front-panel switch now always selects APF in CW

mode. (In AFSK-D and FSK-D modes, DUAL PB still turns the dual-peak audio filter on/off.)

MCU 5.09 / DSP 2.83, 1-25-2015

*** KPA3 DRIVE LIMIT CHANGES:** Per-band limits on KPA3 drive level were introduced in rev. 5.04. If a memory was recalled that had been programmed before the 50-W TX gain calibration was done on the current band, the drive limit would be lost. Also, the drive limit had been set too low. **Those who loaded rev. 5.04 should load 5.09 and re-do the 50-Watt gain calibration**, which is automated by K3 Utility.

*** SYNTHESIZER TEST ON POWER-UP FIXED:** The synthesizer presence check was not being done correctly in all cases.

MCU 5.04 / DSP 2.83, 1-14-2015

*** KPA3 OVERDRIVE PROTECTION:** Power amplifier efficiency can be reduced if operated into certain reactive loads, or with reduced power supply voltage. Normally this will be revealed by TX current drain or reflected power measurements, allowing the firmware to quickly reduce power output to a safe level. The latest release provides an additional margin of safety by putting an upper limit on drive power into the KPA3. The maximum allowed is based on data obtained during TX GAIN calibration. **How To Set Up Drive Limits:** After loading rev. 5.03 firmware, re-do the 50-W calibration step on each band. This can be done manually, or via the automated TX GAIN procedure in **K3 Utility**. A 50-W capable dummy load is required, per the K3 owner's manual (pg. 49).

*** NO CW QSK AUDIO ARTIFACTS IN PRESENCE OF QRM:** In previous releases, CW QSK break-in speed was maximized by saving receive audio in the DSP "pipeline" on key-down, then inserting it back into audio stream on key-up. This resulted in audible artifacts when operating in the presence of heavy noise or QRN. The operator now has the option to clear the DSP pipeline on key-down, eliminating the artifacts. This provides much cleaner CW operation, at the expense of a slightly longer delay before receive audio recovers (we'll improve this in a future firmware release). **To select the old or new QSK algorithm**, tap '3' in the CW WGHT menu entry (CONFIG menu). "New QSK" clears the DSP pipeline; "Old QSK" saves it and inserts it back in on key-up. **Historical note:** The original "Old QSK," which used even shorter mute times, is no longer available. Some operators felt it provided somewhat better QSK (reduced artifacts). But the new algorithm (now "New QSK") is far superior in this regard.

*** Fixed size of front-panel-flash file (hfp0116.HEX):** Eliminates firmware load error with older Mac versions of K3 Utility, and reduces flash file load time in all cases.

MCU 4.93 / DSP 2.83, 10-16-2014

* **PSK63 MODE ADDED:** To select PSK31 or PSK63, first tap either end of the MODE switch to select DATA, then hold the DATA MD switch and use VFO A to select the PSK data rate.

* **KAT500 POWER-ON REMINDER ON K3 DISPLAY:** If a powered-off KAT500 is pulling the auxBus signal low when the K3 is first turned on, "TURN ON KAT500" is displayed. Previously this condition would lock up the K3 without explanation.

* **K3/0-MINI TX NOISE REDUCTION:** Polling by Remote-Rig units is suspended during PTT use to reduce a "ticking" noise heard in some cases.

* Changes to synthesizer, KXV3, and KPA3 device drivers (no effect on normal operation).

MCU 4.86 / DSP 2.83, 6-9-2014

* **REAR HEADPHONE JACK CONTROL:** The rear headphone jack (on the KIO3) was recently changed to a different type whose speaker-cutout switch logic is inverted from the original. If speaker audio is missing even without phones plugged in, you'll need to change the setup. Locate CONFIG:SPKR+PH, then tap '1' to switch to "PH.R SW-" (inverted). Tapping a second time reverts back to the original setting, "PH.R SW+".

MCU 4.83 / DSP 2.82, 2-8-2014

* **FSK-D (RTTY) POWER-CONTROL BUG FIX:** Power output can now be increased while in transmit mode when using FSK-D.

* **KAT500 ATU SUPPORT:** Automatic retuning of KAT500 LC network as K3 VFO is moved. VFO frequency messages are sent via the auxBus. Sends VFO A frequency except in SPLIT mode, where VFO B frequency is sent.

MCU 4.81 / DSP 2.82, 1-25-2014

* **XVTR IF BAND CAN NOW BE 10 OR 18 MHZ** (in addition to the original selections).

MCU 4.80 / DSP 2.82, 1-13-2014

* **RTTY BAUD RATE NO LONGER STORED PER-BAND/PER-MEMORY:** The FSK-D/AFSK-A baud rate (45 or 75 baud) is now global, meaning that one setting applies in all cases. The baud rate is set by holding DATA MD, selecting FSK-D or AFSK-A using VFO B, then selecting the baud rate using VFO A.

* **FIXED MACRO EXECUTION BUG AFFECTING "SB", "MD", "DV", "BW" commands.** These would sometimes not work correctly when used in macros.

* **RTTY/FSK IMPROVEMENT:** In FSK-D mode using an PC-generated FSK input, the K3 no longer exhibits DSP errors (ERR DSE) or loss of commu-

nications. Previously, these may have occurred when the K3 was sent too many serial (RS232) commands.

MCU 4.77 / DSP 2.82, 12-30-2013

*** NO LOSS OF RS232 DATA DURING BAND CHANGES:** On any band change, the K3 sends band data to possibly-connected XV-series transverters and the KRC2. This takes 15 milliseconds, during which RS232 data (from PC applications) was locked out. RS232 data is now properly handled during this time, which could eliminate some K3-to-PC communications issues on band change.

MCU 4.76 / DSP 2.82, 12-11-2013

*** LOGGING OF REMOTE-CONTROL COMMAND ERRORS (ERR DSE):** Rapid polling of the K3 by a PC application program can in rare cases result in overflow of the K3's internal serial data buffer, leading to the execution of an invalid control command and a subsequent internal MCU-DSP communications error. When this occurs, the K3 will now send "E*DSEn;" to the attached host, where <n> is 0 if the error occurred when addressing the main DSP and 1 for the aux DSP. Application developers can then consult their communications log file to see what commands were being sent at the time.

MCU 4.74 / DSP 2.82, 11-16-2013

For those using PC software:

*** BW and FW (BANDWIDTH) SET COMMANDS SENT DURING TX ARE REJECTED** (K3 returns "?;"). This prevents a possible DSP error (ERR DSE). A future release will allow use of these commands, as well as the "WIDTH" control.

*** DV and SB (DIVERSITY and SUB) SET COMMANDS SENT DURING TX ARE REJECTED** (K3 returns "?;"). This avoids possible side-effects.

For those using Remote Rig mode:

*** REMOTE-RIG BUG FIXES:** (1) speaker mute when entering TERM mode; (2) MODE display swap on PTT; (3) connection lost during PTT (when K3 was out of band before entering TERM mode); (4) encoder commands with VFO A/B locked before entering TERM mode; (5) VFO B lock now working in remote mode.

MCU 4.73 / DSP 2.82, 11-11-2013

*** RIT CAN NOW BE TURNED ON/OFF DURING TX:** This applies to both the RIT switch and the "RT" remote-control command. **Note:** If RIT is turned on or off *during* transmission of a CW character, the length of one code element may be affected. This will be corrected in a future release.

*** CRYSTAL FILTER OFFSET ADJUSTABLE IN CW MODE:** You can now set the crystal filter lower edge in CW mode to 0.1, 0.2, or 0.3 kHz above zero

beat. The default is **0.2 kHz**. The **0.1-kHz** selection provides enhanced bass response, but may allow you to hear a low-pitched opposite-sideband signal when tuned near very strong signals. The **0.3-kHz** selection may be preferred by some operators in extremely strong-signal environments. **To change the setting:** Select CW mode, then go into MENU:RX EQ and tap '0' (CWT) to choose the desired XFIL LO value.

* A>B SWITCH TAP SENDS VFO UPDATE IN "AI2" MODE: This is useful for those writing computer-control applications.

MCU 4.67 / DSP 2.81, 4-16-2013

* FIXED LCD ICONS FOR NOTCH, MANUAL NOTCH, and NORM "wings" on DSP graphic. Applies to version 'B' front panel hardware only.

NOTE: Tap '1' in the FW REVS menu entry to see the front panel hardware version. VER A and VER B differ only in the type of LCD driver IC used.

MCU 4.66 / DSP 2.81, 3-22-2013

* FSK-D KEYING BANDWIDTH GREATLY REDUCED: This change reduces the amplitude of the FSK-D keying sidebands by 25-30 dB at a 500-Hz offset, giving the K3 one of the cleanest FSK signals available.

* K3/0 (REMOTE-RIG) IMPROVEMENTS: (1) Supply voltage can go down to 7.6 V; (2) VFO lock works correctly; (3) TX LED no longer gets out of sync.

MCU 4.62 / DSP 2.80, 11-29-2012

* IMPROVED HANDLING OF SERIAL I/O (RS232) ERROR CONDITIONS.

* SUPPORT ADDED FOR ALTERNATIVE LCD DRIVER IC. This has no effect on radio operation.

MCU 4.61 / DSP 2.80, 11-19-2012

* RIT AND XIT NO LONGER TURNED OFF UNINTENTIONALLY: In previous releases, changing bands via direct frequency entry (FREQ ENT) or remote-control band change commands (FA, FB, and BN) would turn off RIT and XIT. This was true even if CONFIG:SPLT SV was set to YES.

MCU 4.60 / DSP 2.80, 11-17-2012

* ESSB TRANSMIT CAN USE THE FM FILTER: The wide (FM) crystal filter can now be assigned to ESSB transmit as well as FM and AM. This can potentially free up a crystal filter slot for customers who were using the 6-kHz filter only for AM/ESSB. **NOTE:** The 6-kHz filter is still recommended for high-performance ESSB and AM receive, as it will provide significantly better close-in dynamic range than the FM filter.

* TRANSVERTER FREQUENCY ENTRY FIXED: The previous release did not handle direct frequency entry to transverter bands correctly (e.g., 144 MHz came out as 180 MHz).

MCU 4.58 / DSP 2.80, 11-7-2012

* CW DECODE IMPROVED: The CW decode algorithm now includes its own AGC system, independent of regular AGC threshold/slope/decay settings. Decode of element spaces vs. word spaces adjust slightly to improve rate of copy on average code samples.

* KEYER PADDLE ENABLED IN FSK-D/PSK-D MODES ONLY IF TEXT DECODE IS ON: Those using FSK-D/PSK-D via with a computer requested that the paddles be disabled when the K3's internal text decode is OFF so that hitting the paddles accidentally doesn't interfere with PC-based transmission.

MCU 4.57 / DSP 2.79, 10-24-2012

* AM TRANSMIT CAN USE THE FM FILTER: The wide (FM) crystal filter can now be assigned to AM transmit as well as FM. This can potentially free up a crystal filter slot for customers who were using the 6-kHz filter only for AM.

* K3EXREF USERS MUST NOW ENABLE THE MODULE IN THE MENU: To do this, locate the CONFIG:REF CAL menu entry and tap 2 to change the setting; flashes XREF IN or XREFOUT. If you DO NOT have a K3EXREF module installed, use the XREFOUT setting (the default). If you use the XREF IN setting without a K3EXREF module installed, you may hear digital switching noise on the 6-meter band.

* REMOTE-RIG (K3/0) BUG FIX: The SUB RF GAIN control now works correctly.

* XVTR BAND DISPLAY FIXED FOR MICROWAVE BAND DISPLAYS: Previously, a band defined as 3400 MHz in CONFIG:XVn RF would not produce the correct display when the VFO was tuned below 3400 MHz.

* PSK-D/FSK-D PROSIGN TRANSMIT FIXED: Was sending "BB" for "BT", "AA" for "AR", etc., always duplicating the characters.

* VOX TRANSMIT TERMINATION VIA REMOTE CONTROL FIXED: The "RX;" remote control command will now properly terminate transmit when VOX is in use. Some customers who use VOX in audio data modes will find this useful. Previously the K3 would sometimes not exit transmit, requiring an additional "RX;" command.

* VFO A/B REV AND SWAP DE-GLITCHED: In rare cases, swapping VFOs would generate a loud audio artifact.

MCU 4.51 / DSP 2.76, 5-9-2012

* AGC IMPROVEMENTS: AGC threshold (CONFIG:AGC THR) can now be set much higher, and the AGC has better (more monotonic) response curves. Greatly improves signal clarity in pile-ups and other high-noise or dense-signal situations, especially with threshold set to 12 or higher. NR and autoNotch can be used at all threshold settings.

MCU 4.48, 1-13-2012

* K3/0 SUPPORT: If the unit is designated as a K3/0 (via an EEPROM ID value), power-on self-tests and run-time tests associated with non-populated hardware are skipped. This allows the unit to power up much more quickly for use with RemoteRig.

MCU 4.47 / DSP 2.73, 10-19-2011

* MORE ROBUST "GT" CONTROL COMMAND (AGC): Some PC applications may accidentally turn AGC off, possibly due to a buffer overflow. The GT command format is now verified more rigorously, making this less likely. NOTE: PC applications should not send too many K3 "get" commands simultaneously, especially if a P3 is also in the system. Ideally they should wait for a response to each command before proceeding.

MCU 4.46 / DSP 2.73, 9-20-2011

* REMOTE-RIG SUPPORT: One K3 can now directly control another, with one acting as nothing but a front panel. This "remote rig" mode provides a nearly perfect emulation of the remote K3's display and controls. (Previously, front panel emulation was limited by the K3's legacy command set.) The simplest way to use this is to connect the two K3s together using a "null modem" cable at the RS232 ports. However, by using a computer or a third-party hardware as an intermediary, it's possible to control a K3 over the internet or even a WiFi connection.

Note that the controlling K3 can have a totally different configuration from the remote K3. It could be a K3/10 with no options, for example, yet it could still control a remote K3 with *all* options, including sub receiver, KPA500, etc.

To use Remote-Rig mode, set both K3s to 38.4 kb and connect them together via the RS232 ports (possibly using an intermediary device). Next, at the local K3, hold CONFIG until you see "TERM" on VFO B. If the remote K3 is listening, the TERM

message will be replaced with a display that looks exactly like the remote K3's. From then on, the remote K3 can be controlled by the local one (the remote K3 can still be controlled with its own front panel, too). The local K3's audio will be muted. Both receive and transmit audio must be handled by the intermediary device.

To exit Remote-Rig mode, hold CONFIG on the local K3 until you see "NORM" flashed on VFO B. The local K3 will return to normal operation.

MCU 4.43 / DSP 2.73, 8-30-2011

*** POWER CONTROL COMMAND WORKING WITH XVTRs:**

The "PC" remote control command now works correctly with transverters.

For example you can send "PC150;" to set I.F. output to 1.5 mW.

(This also applies to HF bands if CONFIG:KXV3 is set to TEST.)

Note that the upper bound on power output level is specified per-transverter band using the CONFIG:XVn PWR menu entry.

Please review the K144XV manual when setting up the drive level for the internal 2-meter module.

*** PRELIMINARY SUPPORT FOR "REMOTE-RIG" MODE (details TBD).**

MCU 4.42 / DSP 2.73, 8-24-2011

*** 2-METER FREQUENCY LOCKING TO REF CAL & EXT. REF:**

The K144XV RFLK option locks the K3's 2-meter module to the rig's master reference. Previously, users of this option had to enter offsets in the CONFIG:XVn OFS menu entry based on how far off the master reference was from 49380.000 kHz. These offsets can now be calculated automatically based on the REF CAL menu entry.

If a K3EXREF module is also installed, then REF CAL itself is automatically calibrated based on an external 10-MHz reference (see **K3EXREF on 2 m**, below).

To enable this, locate XVn OFS in the menu, then tap '0' until you see ÒREFLOCKÓ. This lets the K3 firmware know that the RFLK module is

installed. (If the RFLK option is **not** installed, then the K144XV's oscillators are not locked to the K3's master reference. The offsets should then be set according to the label on the transverter module.)

To see the automatically calculated offset value in the XVn OFS menu entry, the K3 should be switched to the 2-meter band. Otherwise, the K144XV offset parameter may be initially displayed as "-0.00".

K3EXREF on 2 m: If a K3EXREF module is installed, REF CAL itself will be automatically calibrated based on an external 10-MHz reference. In this case, selecting ÒREFLOCKÓ for XVn OFS will allow the K144XV frequency to track this external reference. 2-meter frequency accuracy will be about a factor of around two worse than on HF, due to the higher frequency of the 2-meter local oscillators.

* K3EXREF REF CAL VALUE SAVE: In REF CAL, tapping '1' will now save the K3EXREF-derived reference value as the manually entered value. This is useful in the event that the K3 is ever disconnected from the 10-MHz reference, as it will revert to the manually entered value. Note: To use this feature, a K3EXREF module must be installed, a 10-MHz external reference connected, and an asterisk (*) be present in the menu entry name (ÒREF*CALÓ). You can then tap '1' to save the value.

MCU 4.40 / DSP 2.73, 7-11-2011

* NO ERROR TONE ON KPA500 OPERATE/STANDBY SWITCHING, etc.: Previously, the K3 would emit an error tone on any KPA500 switch event. Now such tones are only emitted if the CONFIG:SW TONE menu entry is set to ON, or on a hard fault.

MCU 4.39 / DSP 2.73, 6-15-2011

* NEW AF MIXER COMBINATIONS (CONFIG:L-MIX-R): Added AB A, B BA, B B, B A, A A. These may be useful for ÒSO2VÓ operation and various DX/contest scenarios.

MCU 4.38 / DSP 2.73, 6-14-2011

* KAT3 IMPROVEMENTS: T/R timing and power thresholds changed to improve SWR measurement sensitivity. This should help on 6 meters in particular.

* ÒBGÓ (BAR GRAPH) REMOTE CONTROL COMMAND: Added 'R' or 'T' at end of command to indicate RX (S units) or TX (watts).

MCU 4.37 / DSP 2.73, 4-30-2011

* ADDED "SMH" COMMAND (high-resolution S-meter):

This is presently experimental; it is intended to work with W8WWV's ÒS-meter LiteÓ program. "SMH;" responds with "SMHxxx;" where xxx is approx. 005 @ S-1, 040 @ S-9, and 100 @ S9+60. Resolution is approximately 1 dB.

NOTE: The value returned will probably be adjusted after testing.

* P3 and PC NOTIFIED ON RX ANT CHANGE: Switching RX ANT on/off now informs the P3 and a connected PC of possible changes to the preamp and attenuator settings. These are stored separately for the RX ANT on and off cases.

* SUB RECEIVER ANTENNA MESSAGE: Suppose both main and sub receivers are on 6 meters, with sub sharing the main antenna. If the main receiver is then switched to a transverter band, ÒUSE AUXÓ will flash on VFO B, along with the SUB icon, for about 3 seconds. This alerts the operator that the sub will not have any incoming signal from the main antenna path. The user should switch to the sub receiver's AUX antenna. (This warning already appears if the main receiver is switched to a band whose low-pass filter would attenuate signals on the sub receiver band.)

* "ERR 12V" VERIFICATION: If the PA 12 volt input is found to be missing, it is checked a second time (after a delay), to make sure it wasn't due to noise.

MCU 4.36 / DSP 2.73, 4-20-2011

* KPA500-TO-K3 BAND CHANGE, FAULT/STATUS, and POWER CONTROL: If the KPA500 is connected to the K3 via the ACC cable (including auxBus and band data lines), the following new features will be available:

- (1) the amp's band switches can change the K3's band
- (2) amp faults and operate/standby changes will be reported on the K3 display
- (3) if CONFIG:PWR SET = PER-BAND, the K3 will provide two separate sets of per-band power levels: one for use with the KPA500, one for barefoot use (amp in standby). If the amp power levels are in effect, an asterisk is added to the K3's power control display (e.g. 030 W*0). This should eliminate the need to adjust the K3's power control when changing bands or switching the amp between operate and standby.

* REF*CAL ASTERISK BLINKS DURING K3EXREF DATA RECEIPT.

* UP & DN REMOTE COMMANDS NOW UPDATE P3.

MCU 4.31 / DSP 2.72, 3-23-2011

* QRQ CW AUTO-OFF ON SPLIT/RIT/XIT: QRQ CW is now automatically turned off whenever you turn on SPLIT, RIT, or XIT. You'll see "QRQ OFF" flashed on VFO B. QRQ mode is restored if you turn these off. (For QRQ CW details, see Rev. 4.03 notes.)

* REVERSE (REV) FOR FM/REPEAT IS PERMANENT: Pressing REV when in FM mode with a repeater offset (+/-) selected now permanently swaps RX/TX frequencies and reverses the repeater offset direction. You do not have to continue to hold the REV switch.

* 2-METER MODULE 0S90 METER LEVEL ADJUSTED: The 0S90 level on the K3's S-meter now occurs with an input signal level of -93 dBm when the K144XV is selected. (This is a recognized standard on bands from 2 meters up. On other bands, 0S90 still

occurs at -73 dBm.) Notes: (1) The K3's S-meter may not go all the way to S0 on this band because of the high preamp gain on the K144XV module. (2) If you have SMTR MD set to NOR, the S-meter reading will vary with the settings of the PRE and ATTN controls.

* FRONT PANEL MIC PREAMP GAIN CONTROL: The front panel mic preamp has a high-gain setting that is now accessible. (This is independent the present Òmic boostÓ DSP function.) If you use a low-output mic element, you may benefit from the high-gain setting. In MIC SEL (MAIN menu), use VFO A to select the front-panel mic (FP), then tap '7' on the keypad to select high preamp gain. A Òhigh barÓ symbol will appear to the right of the mic boost character (L or H). As a reminder, DSP mic boost (H, or Hi) can be turned on/off by tapping '1' on the keypad. Bias is controlled by '2'.

* EXTERNAL 10-MHZ REFERENCE SUPPORT (K3EXREF):

When the K3EXREF option is installed, the K3 will use it to automatically calibrate the internal 49.380 MHz reference oscillator. The user must provide a suitable 10-MHz input signal to the module. Typical accuracy at the operating frequency, when locked, is +/- 1 Hz, (The K3EXREF uses frequency locking, not phase locking. See K3EXREF installation manual for further details.)

Remote-Control/Switch Macro Command Changes:

* "AP" COMMAND TURNS APF ON/OFF: You can turn the CW audio peaking filter on/off by sending ÒAP1;Ó or ÒAP0;Ó, respectively. Applies only in CW mode with CONFIG:DUAL PB set to APF. (Not yet available for direct sub receiver control. Swap VFOs or do A>B copy in order to set up sub receiver APF.) You can use this command to create a TAP function to turn APF on/off; use the Help function in K3 Utility for details on macros.

* "BG" COMMAND USEABLE IN TX MODE: Reads PWR or ALC depending on METER setting. Note: In RX mode, BG returns up to 21 with CWT off, but only up to 09 with CWT on. Also, at

present there is no way to read CWT, SWR, or CMP.

* CHANNEL HOPPING CANCELLED ON FA/FB BAND CHANGE.

MCU 4.25 / DSP 2.71 / FPF 1.14, 12-13-2010

* P3 FIXED-TUNE MODE SUPPORT: The P3 now has a "fixed-tune" mode, where the displayed range remains constant as the VFO is turned. Requires P3 firmware rev 0.44 or later.

* FIXED A/B SWITCH PROBLEM DURING BAND CHANGE: CW or SSB filter setups were sometimes getting changed when a quick memory was recalled, followed by a quick tap of A/B.

For software developers:

* FW\$ GET NOW WORKS. Was authorizing only BW\$ GET.

* BN\$ GET NOW WORKS. Intended to exclude only BN\$ SET but excluded both.

MCU 4.22 / DSP 2.71 / FPF 1.14, 11-23-2010

NOTE: Be sure to install all firmware files for this release, including FPF 1.14. Otherwise your menu text will be incorrect.

* SSB Reduced Power Level Bug Fixed. Error was introduced in DSP 2.65.

* AutoNotch "stutter" on return to Tx to Rx transition Fixed. Error was introduced in DSP 2.62.

* APF (AUDIO PEAKING FILTER) ADDED: APF provides enhanced copy of weak signals in CW mode, and is especially useful when signals are at the noise level. The K3's APF is patterned after the most successful analog APF implementations, and is equally effective in user tests. To use APF, make sure CONFIG:DUAL PB is set to APF. (This is the default. "NOR" restores the original DUAL PB function.) Then hold DUAL PB to turn APF on/off. A special DSP graphic display is used to show that APF is in effect. At the time APF is activated, the regular I.F. SHIFT setting, if any, is "frozen," and SHIFT then controls the center pitch of the APF filter in 5-Hz steps. APF is independent for the main and sub receivers, as well

as for presets I and II. Switching between these two presets is a convenient way of turning APF on/off quickly.

* ADDED VOICE TX ÒFAST MONITORÓ: Normally the voice monitor includes a ~20-ms delay, which is necessary to hear how your on-air signal will sound (with compression, etc.). If you prefer to not hear any delay in the voice monitor, set CONFIG:TX MON to FAST.

Note: You'll still hear the delayed and processed monitor if you adjust the MIC, CMP, TX EQ or TX GATE settings while transmitting.

* TX NOISE GATE IMPROVEMENT: The Noise Gate/Downward Expander for voice modes has smoother response and much improved performance near the threshold.

* NARROW AF FILTER IMPROVEMENT: Adjusting SHIFT and WIDTH when using very narrow DSP filters no longer causes 'pop' artifacts.

MCU 4.15, 10-14-2010

* MSG CHAIN BUG FIX, FSK-D MODE: Chaining was resulting in a receive offset in some cases.

MCU 4.14 / DSP 2.60 / FPF 1.13, 10-6-2010

* ELIMINATED POWER-UP SELF-TEST ERRORS (ERR BP1, etc.): On rare occasion, a K3 would display a series of error messages on power-up. This has been corrected.

MCU 4.13 / DSP 2.60 / FPF 1.13, 9-23-2010

* P3 UPDATED CORRECTLY ON K3 A/B SWITCH PRESS.

* P3 FUNCTIONS CORRECTLY AFTER REV SWITCH PRESS: Previously, holding REV at the K3 would cause the P3 to stop tracking K3 VFO movement. Note: At present, holding REV does not result in any change in the P3 display. This will be corrected in a future revision of K3 firmware.

* BN REMOTE CONTROL COMMAND (BAND CHANGE): This command now changes bands more quickly.

MCU 4.12 / DSP 2.60 / FPF 1.13, 9-15-2010

- * **K3-to-P3 SERIAL COMMUNICATIONS:** The K3/P3 RS232 interface has been optimized to eliminate problems with VFO tuning and some third-party PC applications such as HRD.
- * **DVR TRANSMIT MONITOR SEPARATELY ADJUSTABLE:** Applies to TX message play as well as transmit playback of the 90-second loop. First, set CONFIG:TX DVR to **IND** (independent) and exit the menu. Next, hold in the CMP/PWR knob to select MON. Holding the knob in a second time alternates between MON xx and DVR xx. You can adjust MON or DVR level during transmit playback.
- * **NO GAP IN 6-METER POWER RANGE:** The PA now kicks in at 9 W on 6 m, rather than 13 W as on the other bands. This eliminates the original gap from 9 to 12 W on 6 meters.
- * **60-METER CHANNEL HOPPING DOWN TO 5.366.5 KHZ WORKS:** Previously, the PLL voltage would sometimes go to zero in this case.
- * **VFO B to A COPY NOW UPDATES THE P3.** This is useful for re-centering the P3 at a desired center frequency. For example, you could leave VFO B set to the center of a band segment. After tuning VFO A around, use VFO B>A to go back to the center. (To use VFO B>A, assign CONFIG:VFO B>A to a PFx or Mx switch.)
- * **K144XV S-METER CORRECTION:** The S-meter is now properly compensating for the added gain of the K144XV.
- * **K144XV BAND-DATA OUTPUT ADDRESS RANGE INCREASED:** Originally, CONFIG:XVn ADR was always set to **INT TRN1** to enable the K144XV. This set all band data outputs on the ACC jack to 0. Now, XVn ADR has of **INT TRN0** to **INT TRN9** for the K144XV. Band-data outputs are set accordingly. This may be useful when the K144XV is used as an IF for higher-band external transverters. (If you have a K144XV, the original **INT TRN1** will now be **INT TRN0** in the menu. This is the new recommended setting if you're not using external transverters in conjunction with the K144XV.)
- NOTE:** When using the K144XV, XVn RF can be set to the RF band

of an external transverter that is using the K144XV as an I.F., rather than at the 2-meter band edge (144).

MCU 4.06 / DSP 2.60, 8-19-2010

* DVR PLAY/RECORD FIX: The AF PLAY and AF REC positions within the DVR's 90-second audio loop were not being setup correctly.

MCU 4.05 / DSP 2.60, 7-20-2010

* Additional K3->P3 command responses, including BN.

This release required for production P3 users.

MCU 4.03 / DSP 2.60, 6-10-2010

* 75 BAUD (100 WPM) RTTY SUPPORT: The internal data encoder/decoder now supports both 45 and 75 baud. To select the desired rate, use the DATA MD switch, then rotate VFO A.

* ULTRA-FAST BREAK-IN AND QRQ CW (CW+):

If you set CONFIG:CW QRQ to ON in the menu, the K3 will provide extremely fast break-in at all CW speeds. It will also allow both the internal keyer and external keying to work at up to 100 WPM. (Be sure to turn on both QSK and VOX.) The CW+ mode icon turns on when CW+ is in effect.

Tip: You may want to assign the CW QRQ menu entry to a programmable switch function (e.g., PF1) for quick access. This can be done by locating the CW QRQ menu entry, then holding PF1 until you see PF1 SET.

Note 1: There are limitations to QRQ CW mode at present.

You cannot use SHIFT, or turn on RIT, XIT, or SPLIT. However, you can still use splits, in effect, if you have the sub receiver installed: Turn the SUB on, and use VFO B as the receive VFO. (In a subsequent firmware release, RIT/XIT will be usable over a small range in QRQ mode.)

Note 2: If you use CONFIG:TX DLY to set external keying delay, you may need to adjust its setting for QRQ CW use. Also,

any increase in the default (8 ms) may decrease the maximum available CW speed.

* **AF BALANCE CONTROL IMPROVED:** The SUB AF control can be used as a main/sub RX balance control (see CONFIG: SUB AF). Previously, when the control was rotated fully clockwise, main receiver audio would not be fully turned off. This has been corrected.

* **ADDED ERROR CODE ÒERR RXFÓ.** This message is flashed if you switch to a crystal filter that is too wide for the present settings. For example, ERR RXF will flash if you are in QRQ CW mode and select a filter wider than 2.8 kHz. To correct this, you'll need to turn off wider-bandwidth crystal filters either manually (using CONFIG:FLx ON) or via K3 Utility.

* **FIXED FSK-D STUCK TONE:** Occasionally, sending RTTY using the keyer paddle (FSK-D) would leave sidetone on.

MCU 3.97 / DSP 2.58, 5-9-2010

* **TX INHIBIT IMPROVEMENT:** If TX INH is active (see CONFIG:TX INH), voice monitor and CW/DATA tones are disabled, giving the operator audible feedback about inhibited status to supplement the flashing ÒTXÓ icon.

* **DSP NOISE BLANKER IMPROVED:** A new algorithm has been added that makes the DSP NB more effective on some types of noise. Odd-numbered DSP NB levels (t1-1, t1-3, t1-5, etc.) apply the new algorithm, while even-numbered levels use the original. To avoid unwanted interaction between the NB and on-air signals, always use the lowest effective setting.

* **CW KEYING ARTIFACT WITH AFX/DELAY ELIMINATED:** The ÒDELAYÓ settings of AFX previously created a small audio artifact when listening to CW keying in the presence of background noise or signals.

* **AGC-OFF S-METER IMPROVEMENT:** Turning AGC off no longer

results in a drop in the S-meter reading. This was most noticeable in the presence of strong band noise.

* K144XV S-METER NOW ACCURATE: The S-meter reading is now adjusted to account for RX gain when the K144XV is in use.

* TX NOISE GATE IMPROVED: The voice transmit noise gate now uses a downward expander rather than simple gating.

See TX GATE menu entry for further details.

* MANUAL NOTCH: Pitch now defaults to 1000 rather than 2000 Hz. This starting point is a better compromise between CW and SSB.

* ESSB ON/OFF COMMAND: The new ÒESÓ control command can be used to turn ESSB on/off via a switch macro or from a software application. The K3 must also be in LSB or USB mode before ESSB ON takes effect. (See K3 Programmer's Reference.)

* BN REMOTE CONTROL COMMAND (BAND CHANGE):

Previously this command was ÒGET onlyÓ, returning the present band number (00-24). It can now be used as a SET command to switch to the desired band. For example, BN00; switches to the last-used frequency on 160 m. Note: VFO B will also be restored to its last frequency used on the new band, except in the case where CONFIG:VFO IND is set to YES.

MCU 3.94 / DSP 2.54, 4-17-2010

K3 Memory Editor:

* This revision of K3 firmware works with our new K3 Memory Editor (presently PC/Windows-only, but may eventually work on other platforms). The memory editor allows you to edit frequency memories 00-99 and, if desired, per-band quick memories (M1-M4). Each memory includes a ÒQSYÓ button, providing convenient memory selection. Memory contents can be saved in a file and shared with other K3 users. (Further details posted elsewhere.)

* MEMORY CHANNEL COMMAND (MC): This new remote-control command was created in support of the K3 Memory Editor (see

above). Sending an MC command to the K3 loads VFOs from a memory (or "channel"), emulating M>V. It can be used in switch macros. Examples: "MC080;" loads memory #80. "MC100;" loads 160-m quick-memory M1. (For details on creating macros, refer to K3 Utility Help or the K3 Programmer's Reference.)

Other New Features:

* SEPARATE RECEIVE EQ FOR CW MODE: To set up CW RX EQ, select CW mode, then use MAIN:RX EQ. To set up voice-mode RX EQ, select any non-CW mode. (Mode can be changed while in the menu.)

* SEPARATE TRANSMIT EQ FOR SSB MODE: The SSB transmit passband can now be set up differently from AM/FM/SSB. To set up SSB TX EQ, select USB or LSB with ESB *off*, then use MAIN:TX EQ. To set up AM/FM/SSB TX EQ, select AM, FM, or USB/LSB with ESB *on*. (To turn ESB on/off, tap '1' in CONFIG:TX ESB. When ON, the "SSB" mode icon appears.) Also see TE command, below.

* TRANSMIT EQ SETUP COMMAND (TE): Can be used in switch macros to quickly optimize TX EQ settings for different users or mics. For example, "TE-08+00+00+00+00+00+00+00;" cuts the 50-Hz EQ band by 8 dB.

* Full support for P3 Panadapter. Allows very fast K3-to-P3 response during VFO movement, etc.

For software developers:

* See TE and MC commands, above.

* TEXT BUFFER COMMAND (TB): This is an improvement over the "TT1" method for implementing a CW/data terminal. Returns number of transmit characters from KY<text> packets remaining to be sent, as well as a string containing all available characters, and RX character count.

* Fixed KY<text> problem in PSK-D/FSK-D modes: Sending packets during the 4-second idle time was delaying transmit until end of idle time.

* Now recognizing a slashed-zero character from the PC keyboard

(0xD8) in KY<text> packets. Converted to regular zero.

* IC COMMAND: Added CONFIG:MEM 0-9 setting (byte **a**, bit **1**).

MCU 3.84 / DSP 2.54, 3-22-2010

For software developers:

* NOISE BLANKER LEVEL CONTROL: Added NL and NL\$ commands to remotely set DSP and IF blanker levels for main and sub receivers. Refer to the K3 Programmer's Reference, revision C10 or later.

Changes related to European FM and Repeater Operation:

* 12.5 AND 25 KHZ VFO INCREMENTS (FOR EU REPEATERS) :

Added 12.5 kHz and 25 kHz step sizes in FM mode. To specify step size, select FM mode, then use the CONFIG:VFO CRS menu entry.

* SQUELCH-CONTROLLED 1750-HZ PL TONE: Some EU repeaters require a 1750-Hz PL tone burst to open. Previously, an 0.5-second burst was generated at the start of each transmission.

Now, this tone is only generated if squelch is not already open.

The squelch-controlled PL tone feature can be turned off by setting the PITCH parameter to PL OFF. With either the PL TONE or PL OFF setting, the operator can still do manual PL tone burst as described in the next item.

* MANUALLY CONTROLLED 1750-HZ PL TONE:

The operator can now generate a variable-length tone burst at any time while transmitting by holding PITCH switch.

* PL TONE DEVIATION RANGE CHANGED: The deviation range for the 1750-Hz PL tone is now 1.5 to 6.0 kHz. The default, 3.6 kHz, is about 70% of 5 kHz, as recommended for many EU repeaters.

The deviation for sub-audible tones is now stored separately and has a range of 150-600 Hz (default 360 Hz).

MCU 3.79 / DSP 2.54, 3-5-2010

* RX ANT SWITCH ALLOWED DURING TX. This is useful if you need to compare signal strength of received signals while sending

a repeating CQ message in CW mode.

* **SPURIOUS ERR XXX MESSAGES ELIMINATED:** On rare occasions operators have seen multiple error messages such as ERR BP1, ERR LPF, etc. on power-up. This was caused by a timing error when communicating with SPI-bus devices, such as the shift registers controlling band-pass and low-pass filters.

MCU 3.78 / DSP 2.54, 3-4-2010

* **MENU ENTRY TEXT ON VFO B:** Eliminated occasional incorrect text appearing on VFO B while scrolling through menu entries.

* **AM MODE 9 KHZ TUNING (EU):** Corrected occasional PLL errors related to tuning in 9 kHz steps in AM broadcast band.

* **AFX ÒBINÓ MODE:** Further stability improvement for the ÒBINÓ audio effect (selected by MAIN:AFX). An audio artifact could occur under certain receive-signal circumstances.

MCU 3.77 / DSP 2.53, 2-27-2010

* **DIVERSITY MODE MAIN/SUB RECEIVER OFFSET FIXED:**

In some cases a small frequency offset between the main and sub receiver could be introduced due to transmitting while moving VFO A or the RIT offset. This no longer occurs.

* **SUB RECEIVER BAND-PASS FILTER SWITCHING FIXED:**

If the main and sub receivers were configured for independent band selection (CONFIG:VFO IND = YES), switching the main receiver to any of 17-10 m may have caused an incorrect band-pass filter to be selected for the sub receiver.

* **SYNTHESIZER PLL TABLES UPDATED:** Reduces the DDS tuning range slightly to minimize group delay through the DDS crystal filter. (These tables are located in the ÒHFPF0108Ó file, part of the firmware release package.)

* **AFX ÒBINÓ MODE FIX:** Stability improvement for the ÒBINÓ audio effect (selected by MAIN:AFX). Previously, a loud audio artifact could occur under certain receive-signal circumstances.

MCU 3.76 / DSP 2.52, 1-23-2010

Changes related to K144XV, transverters, FM, and repeaters:

- * REPEATER REVerse: If a repeater offset is in use (+/-), holding REV switches VFO A to the repeater's input frequency.
- * RF POWER BARGRAPH: Now shows *tenths of a milliwatt* when using low-level transverter I/O (applies to both the K144XV and external transverters). 10 bars = about 1.00 mW at the IF. This corresponds to about 10 W output when using the K144XV.
- * COARSE TUNING WITH XVTR OFFSETS: Fixed problem with VFO display when using COARSE tuning steps in combination with a non-zero transverter frequency offset (CONFIG:XVn OFS).
- * IMPROVED FM RECEIVE: FM demodulation algorithm refined to reduce signal distortion.
- * FM SQUELCH: No longer opens briefly during memory recall.
- * "ANT3" REMINDER WHEN K144XV SELECTED: If you switch to a band configured for use with the Elecraft K144XV internal 2-m module, ÒANT3Ó is flashed to remind you to use the separate BNC antenna jack provided on the fan panel, rather than ANT1/2.

Other new features and improvements:

- * NR (NOISE REDUCTION) ON/OFF: This is now saved on a per-band/per-receiver basis (same as NB). NR ADJ (noise reduction setting) is stored independently for each mode.
- * TX MESSAGE MEMORY ERASE: To completely erase a transmit message buffer, tap REC, then M1-M4, then CLR. Note that erasing a CW/DATA memory will not erase a DVR Message assigned to the same M1-M4 switch, and vice-versa.
- * ERR PTT & ERR KEY (rig keyed at power-up): These error conditions no longer lock out the POWER switch.
- * DELAYED MEMORY RECALL (M>V): In CONFIG:MEM 0-9, tap '1' to select "M>V NOR" or "M>V DLY". NOR is the default, resulting in ÒliveÓ memory recall as you rotate VFO A. In the "DLY"

case, the receiver is not updated until you tap M>V a second time to exit memory recall. You may prefer ÒDLYÓ if you have external gear that switches as the K3 changes bands.

* 40-M TX RANGE EXTENDED TO 7.650 MHz (12 W MAX): TX near the first I.F. has always been disabled from 7.550 to 8.990 MHz to protect the 8.21 MHz trap on the KAT3 or KANT3 module. At power settings of 12 W or lower, the upper limit is now 7.650 MHz, allowing use of some additional MARS channels.

Remote Control Command Changes:

* XF/XF\$ COMMAND ADDED: Returns crystal filter number (1-5) presently selected for main (XF) and sub receiver (XF\$). GET only. Not usable during BSET or REVerse.

* SQUELCH STATUS ADDED TO IC COMMAND: Byte **e**, bits **4** (main RX) and **3** (sub RX). 1 = squelched. (Works for both FM and non-FM squelch.)

* SUB RX NR STATUS ADDED TO IC COMMAND: Byte **e**, bit **2**.

EEINIT (EEPROM Initialization) Changes:

- PL deviation (FM) set to 0.36 kHz (was 0.00)
- Power output set to 5/50 W (was 0)
- CONFIG:SPLT SV set to YES
- RTTY mark tone set to 2125 Hz (was 1275)

MCU 3.68 / DSP 2.49, 12-11-2009

* AF OUTPUT PROTECTION IN AGC-OFF CASE: Moved threshold up to prevent false triggering on moderate signals.

* The CONFIG:AF LIM menu entry is now visible without setting TECH MD to ON. The AF LIM entry menu sets up an AF output max level that only applies when AGC is OFF. Recommended value is 18-24. Lower levels provide better protection but clip sooner. Adjust RF GAIN downward to eliminate clipping on individual signals. Narrow-band filtering can also help.

* Synthesizer parameters updated on 6 m to eliminate

possible PLL unlock when tuning in vicinity of 52 MHz.

MCU 3.66 / DSP 2.48, 12-4-2009

* AF OUTPUT PROTECTION: The DSP now automatically senses when AF output would be so strong as to drive the speaker or headphone amplifier into the clipping range. If this happens, AF is muted until you reduce signal levels. (One possible source of excessive audio was a DSP internal overrange, which could result in a very loud audio burst. DSP code has been changed to eliminate such cases.)

* Increased VCO settling time by 1 ms to eliminate a slight chirp noted by some operators (extremely rare).

* Increased SPI bus timing delays on power-up. May eliminate spurious error messages (such as ÒERR AT3Ó) that could occur due to SPI bus loading by multiple option modules.

MCU 3.63, 11-20-2009

* PTT USE WITH DVR: If the KDVR3 menu entry '1' tap option is set to AUTOPTT (the default), then PTT behaves as follows:

- If you start DVR message play first (by tapping M1-M4), *then* assert PTT during the message, DVR play will be cancelled.
- If you assert PTT first, then play a DVR message, it will play normally, and will complete even if you let go of PTT.

You can also cancel DVR message play by tapping REC, as usual, whether PTT is asserted or not. (Or cancel from a computer using the ÒRX;Ó command – see below.)

Note: If the KDVR3 menu entry '1' tap option is set to USE PTT, then PTT is required as a qualifier for DVR message play. In this case, releasing PTT in the middle of a DVR message will cancel it.

Remote Control Command Changes:

* DVR MSG PLAY CANCEL: You can now use the ÒRXÓ command to cleanly cancel DVR message play (as well

as any other transmit or message-play function, in any mode).

* CONFIG:DIGOUT1 MENU PARAMETER is now accessible with the "OMP" command. Values 000 and 001 only; get/set.

MCU 3.59 / DSP 2.46, 11-18-2009

* FSK-D WAS CHANGING TO AFSK-A ON A/B or REV: Fixed.

* AM SYNC VFO TRACKING ACCURACY IMPROVED (DSP 2.46).

* SWR INDICATOR TONES AFTER ATU TUNE: If switch tones are enabled, a second tone will be emitted following an ATU TUNE. This tone provides a rough idea of the SWR that the KAT3 was able to obtain:

Lower pitch than 1st tone: Unknown SWR (ant. may be shorted)

Same pitch as 1st tone: SWR ≤ 2.0:1

Medium-high pitch: SWR ≤ 3.0:1

High pitch: SWR > 3.0:1.

This feature was added primarily for our blind customers, but it's useful whenever you tap ATU TUNE without looking at the final SWR reading.

Remote Control Command Changes:

* IC COMMAND (ICON status): Now returning correct message bank in voice modes (byte a, bit 3).

MCU 3.57 / DSP 2.45, 11-7-2009

Misc. Improvements:

* TUNE SWITCH: "Double beep" with NR on eliminated.

* DATA A: Loss of power when using TUNE corrected.

New Feature: Synchronous AM Receive

* SYNCHRONOUS AM: Outperforms regular AM during selective fading. Provides optional automatic VFO tracking of AM signals up to +/- 2.5 kHz. Select AM mode, then hold **ALT** to select AM-**S**. The **-S** icon flashes slowly if the signal is noisy. Select **AM-S LSB** or **USB** using **SHIFT**; one of the two sidebands may reduce QRM. Sync AM also works with diversity receive. (Note: Some AM broadcast stations encode their carrier, resulting in a low-pitched noise when Sync AM is turned on.)

With Sync AM you can tune manually, or use automatic VFO tracking:

-- If tuning *manually*, you need to tune to within +/- 10 Hz of the actual carrier frequency, at which point the K3 will phase-lock to the carrier.

-- To enable **VFO tracking**, tap **CWT**, which turns on the **T** icon. Or, tap **SPOT** to engage VFO tracking just long enough to lock. When tracking is on, the VFO may "hunt" slowly across a span of several Hz.

IMPORTANT: For AM QSOs, use **SPLIT** mode when VFO tracking is turned on. VFO B (TX) will remain fixed while VFO A tracks RX signals.

Limitations: At present, VFO B cannot auto-tune in AM-S. Also, both VFOs will always be in the same mode (AM-S LSB or USB).

Remote Control Command Changes:

* UP0/DN0/UP\$0/DN\$0 moves VFOs 1 Hz. Similarly, UP8 and UP9 move the VFOs by 100 and 200 Hz, respectively.

MCU 3.52 / DSP 2.43 / K3 Utility 1.2.10.27, 10-28-2009

Misc. Improvements:

* Eliminated some audio artifacts noted during control changes.

* Eliminated interruption of transmitted CW signal when certain switches were tapped, including RIT, during external keying.

* VFO LOCK PREVENTS COARSE STEPS VIA OFFSET CONTROL:

Normally, you can use the RIT/XIT offset control to move VFO A in coarse steps if (1) RIT and XIT are both turned off, and (2) CONFIG:VFO OFS is set to ON. Now, these conditions are overridden if the VFO is locked.

* AUTO-NOTCH IN SSB MODE EASIER TO TURN ON/OFF: The NTCH switch now behaves differently in SSB mode. Tapping it turns auto notch on-off, rather than cycling through off-auto-manual notch. (To turn on manual notch in SSB mode, hold the NTCH/MANUAL switch.)

New Feature: Main/Sub AF Mixing Menu Entry

* AUDIO MIXING CONTROL ADDED: Normally, main receiver audio is heard in the left audio channel, and sub in the right. Using the *CONFIG:L-MIX-R*

menu entry, you can now put main in both channels while leaving sub in only

one (or vice-versa, or even put both receivers in both channels). Another benefit of this change is that AFX (audio effects) can be used even while the sub receiver is turned on. (AFX, if turned on, will apply to any receiver whose audio is mapped both left and right.)

Notes: Applies only to non-diversity mode use of the sub receiver. (In diversity mode, left/right differentiation is maximized for best results.)

You'll need stereo headphones or speakers to listen to stereo separation and audio effects. Set CONFIG:SPKRS to 2 if using stereo speakers. (Headphones will always work with stereo material unless SPKRS is set to 1 *and* CONFIG:SPKR+PH is set to ON.)

New Feature: User-Defined Switch Functions (e.g., ÒSPLIT+2Ó)

* SWITCH MACROS: You can now program the K3's PF1-2 and M1-M4 switches to execute K3 remote control sequences, or Òmacros.Ó They are created and tested using K3 Utility (rev. 1.2.10.26 or later). Once macros are finished, you can send them to the K3, where they can be assigned to any programmable function switch. The K3 Programmer's Reference, revision C6, has a number of sample macros and further details.

Example: *A>B, A>B, SPLIT, VFO B up 2 kHz, RIT/XIT off*, assigned to **PF1**

To create a macro and assign it to a K3 front panel switch, you'll need to complete steps 1-8 below. Once you've been through the process one time, you'll find creating or modifying macros very easy.

1. Run **K3 Utility**.
2. Click on the **Command Tester/K3 Macros** tab.
3. Click on the **Edit Macros** button. This pops up the macro edit window.
4. In MACRO 1's **Macro Label** field, enter the label ÒSPLIT+2Ó.
5. In the **Macro Commands** field, enter:

SWT13;SWT13;FT1;UPB5;RT0;XT0;

(The number **5** in the ÒUPB5Ó command is not a value in kHz; it is an index into a table of step sizes. UPB5 moves VFO B up 2 kHz,

DNB5 moves it down 2 kHz, etc. There are similar commands for VFO A. For the full list, see the ÒDNÓ (down) command in the Programmer's Reference.)

6. Click on **Send Macros 1-8 To K3**.

7. At the K3, locate *CONFIG:MACRO x* menu entry, and tap '1' if the menu entry label is not already ÒMACRO 1Ó.

8. Hold PF1 to assign PF1 to MACRO 1. Exit the menu.

From then on, PF1 will flash ÒSPLIT+2Ó and execute the above sequence.

Note: M1-M4 cannot be used simultaneously for both message play and macros. To revert an Mx switch back to message play, first switch to CW mode, then tap Mx, tap REC, and tap Mx again. This will also restore message play for DVR purposes (voice modes).

Remote Control Command Changes:

* MP COMMAND ACCESS ADDED TO: LCD ADJ, LCD BRT, LED BRT.

This allows creation of a switch macro that does LCD DIM/BRT, for example.

You can also use MP to control the new Main/Sub Mix menu entry.

See K3 Programmer's Reference, revision C6 or later.

* Switch- and menu-emulation commands now run to completion before subsequent commands in the buffer are handled. This means that applications and macros using these emulation commands no longer have to insert delays (such as dummy ';' commands).

* ÒBWÓ (BANDWIDTH) REMOTE CONTROL COMMAND ADDED: This is a

non-modal version of FW (it work with either the K30 or K31 meta-command in effect).

* ÒSBÓ REMOTE CONTROL COMMAND ADDED (sub receiver on/off).

* ÒLNÓ REMOTE CONTROL COMMAND ADDED (link/unlink VFOs).

* ÒKYWÓ VARIATION OF ÒKY<MSG>Ó COMMAND ADDED: Waits until the current message has been sent before processing other host commands.

This is useful if the ÒKY<MSG>Ó command is followed by other commands, such as ÒKSÓ (keyer speed control). See examples in

Programmer's Reference.

* ÒSWTÓ / ÒSWHÓ COMMAND IMPROVEMENT: These switch emulation commands are now *non-modal* (they will work with either the K30 or K31 meta-command in effect).

* ÒDNÓ / ÒUPÓ COMMANDS IMPROVED: These VFO movement commands have extended functionality and are now *non-modal* (they will work with any of the K2x meta commands in effect).

MCU 3.44 / DSP 2.38, 10-14-2009

* TUNE & ATU TUNE NOW WORK IN DATA A MODE/SPLIT: TUNE and ATU TUNE were producing no power output in DATA A /SPLIT, even though normal transmit worked correctly.

* NON-FM SQUELCH WORKING ON A/B VFO SWAP: In some cases in SSB or CW mode, squelch could end up permanently closed when swapping VFOs and listening to strong signals.

* NOISE REDUCTION CONTROL: Internal self-tests added to further reduce the likelihood of AF artifacts or continuous switch feedback tones when turning NR on/off, changing bands, etc.

MCU 3.42 / DSP 2.37, 10-06-2009

* POLLING PROBLEM WITH HRD FIXED: With no sub receiver installed, HRD (Ham Radio Deluxe) was still able to poll for its revision number, causing a timeout.

* SQUELCH CAN BE SET FULLY CLOCKWISE: In some cases rotating the squelch pot fully clockwise would open the squelch.

MCU 3.41 / DSP 2.37, 10-02-2009

* IMPROVED RX LOW-FREQUENCY RESPONSE in AM/SSB/CW MODES: Most noticeable with hi-fidelity headphones or large speakers. NORMalizing the DSP passband still sets the cutoff to about 100 Hz, but DSP controls can be adjusted to provide a lower response. RX EQ can enhance bass further.

* NO RX EQ OR TX EQ IN DATA MODES: That is, the response is flat. The RX EQ and TX EQ menu entries now affect only the other modes.

* "LIVE" MEMORY RECALL (M>V): If you tap M>V, then start rotating

VFO A to select a memory, the K3 will now switch to the band/mode of each memory. Exit memory recall by tapping M>V a second time.

* VFO COARSE STEP ROUNDING: Tap '1' in the VFO CRS menu entry to select RND=NO or YES. If YES, the VFO frequency will be rounded off during COARSE tuning. This menu entry also sets the per-mode COARSE step size. **Note:** The RIT/XIT control moves the VFO in coarse steps if RIT and XIT are not in use (use CONFIG:VFO OFS to turn this on/off).

* SSB COARSE STEP SIZE OPTIONS NOW 0.1, 0.5, 1.0, and 2.5 kHz: Replaced 5.0 kHz with 0.5 kHz.

* CWT (TUNING AID) NOW INDEPENDENT FOR CW & DATA.

* RF GAIN CALIBRATION PROCEDURE UPDATED: You'll need the latest revision of K3 Utility and a 50-microvolt signal source (e.g., an XG2).

* SUB RX NOISE BLANKER NOW FULLY INDEPENDENT OF MAIN: This includes the on/off state and NB LEVEL settings. **Note:** Set CONFIG:NB SAVE to YES to preserve your per-band NB on/off settings.

* DSP INTERNAL STATUS MONITORING: In the TECH MD menu entry, tapping 1 (main) or 2 (sub) displays DSP status information. If it is 0xFFFF, no error has been detected. Tapping CLR resets the data to 0xFFFF.

* CHANNEL HOPPING IN FM MODE LOADS REPEATER SETTINGS: Repeater offsets and PL tones are now loaded during scanning/hopping.

* PL TONE DEVIATION ADJUSTABLE: Tapping '1' in CONFIG:FM DEV allows setting PL tone deviation (300-600 Hz in 30-Hz steps; default, 360 Hz).

* EU REPEATER 1750 HZ PL TONE BURST: If a 1750 Hz PL TONE is selected, a 500 ms tone burst will be sent on each PTT activation.

* EXTENDED 6-METER TUNING RANGE: The VFO can now be tuned down to 44 MHz to monitor signals that may be correlated with 6-meter band openings. Loss increases rapidly below 49 MHz (-34 dB at 45 MHz), so a preamp (e.g., the Elecraft PR6) may be needed to obtain a useful NF.

MCU 3.30 / DSP 2.27, 9-2-2009

* RF Gain control now smoother if RF Gain Calibration has been performed. See K3 Utility Help for details.

* **FIXED NOISE BLANKER SWITCHING IN BSET MODE:** You can now independently turn the noise blanker (NB) on/off for the sub receiver in all cases. Previously, the NB switch was locked out in some cases in BSET mode.

* **DVR TRANSMIT WITH MANUAL PTT:** Normally, playing a DVR TX message (M1-M4) automatically asserts PTT and goes into transmit mode. Now, you can manually assert PTT prior to playing DVR messages, if necessary. (This might be required to meet external equipment switching requirements at some stations.) To do this: in the CONFIG:KDVR3 menu entry, tap '1' until you see ÒUSE PTTÓ. (This setting is ignored in VOX mode.)

* **ELIMINATED AUDIO NOISE BURST WITH NR + AUTONOTCH:** Very rarely, the combination of NR and autonotch, in the presence of a strong signal, could result in a loud audio artifact.

* **MORE NR (DENOISER) SETTINGS:** There are now 32 NR settings. F1-x to F4-x originally appeared in firmware revision 3.27, and are recommended for most applications. F5-x to F8-x are the same as F1-x to F4-x from firmware revision 3.25. They provide a varying mix between processed (ÒwetÓ) and unprocessed (ÒdryÓ) audio. When x is 1, the mix is mostly "dry"; when x is 4, it's 100% "wet". A small letter ÒmÓ (e.g. "NR m F5-1") reminds you that "mixed" settings are in use.

Note 1: When you're experimenting with different NR ADJ settings, allow 1 to 3 seconds for the DSP to fully adapt to present signal conditions.

Note 2: F5-x and higher NR settings may alter the amplitude of single-tone (CW) signals somewhat, depending on the pitch. Voice signals are less affected.

MCU 3.27 / DSP 2.24, 8-21-2009

* AUTONOTCH improved.

* SHIFT=.01 BUG FIXED W/LOW SIDETONE PITCH (300 Hz).

* VFOS TUNE DOWN TO 490 KHZ.

For Software Developers:

- * "IS" COMMAND BUG IN 10-HZ MODE FIXED.
- * FINE SHIFT BIT ADDED TO "IC" COMMAND: Byte e, bit 6.
- * "MN" GET COMMAND IMPLEMENTED.

MCU 3.25 / DSP 2.21, 8-11-2009

New Features:

- * NOISE REDUCTION (NR) IMPROVEMENTS: Our new NR algorithm has less impact on signal strength, and should no longer make some weak signals disappear due to over-processing. We may fine-tune the algorithm in future releases, based on operator evaluation, but we've have good reports from early testers.
- * VFO TUNING NOISE REDUCTION: Some operators have reported hearing noise on 60, 10, or 6 meters when tuning the VFO under very quiet conditions. If you experience this, try the following:
In the CONFIG:VCO MD menu entry, tap '1' until you see 'SPI 2' (the default is 'SPI 1'). This alters the timing of data sent to the synthesizer, which in turn changes the spectrum of SPI-bus signal noise. It has no impact on performance. **You will also need to add two resistors and two diodes to the bottom of the RF board (see application note on our K3 modifications web page).**
- * AUTOMATIC RECEIVER FRONT END PROTECTION: If the K3 is operated too close to high-power transmitters, it's possible to damage some receiver components. While this rarely happens, we've taken steps to prevent it by sensing a high-current condition at the mixer post-amplifier (Q8/Q9) and automatically turning off the preamp and, if necessary, turning on the attenuator. **You will need to add one jumper wire on the bottom of the RF board (see application note on our K3 modifications web page).** If you don't add the jumper, operation will be unchanged; firmware can sense whether or not you've installed the jumper.
- * 10-HZ PASSBAND SHIFT STEPS (EXPERIMENTAL):
If CONFIG:PB CTRL is set to SHIFT=.01 for a given operating mode,

the SHIFT control will provide .01 kHz (10 Hz) steps rather than the original .05 kHz (50 Hz). Especially useful with narrow filter bandwidths. This feature is experimental and has some limitations at present: Applies to CW and DATA only; LOCUT/HICUT cannot be used when 10-Hz SHIFT steps are in effect; WIDTH steps remain 50 Hz in all cases. Not compatible with spur removal function yet (CONFIG: SIG RMV); signals mapped out may reappear.

* CW SPEED DISPLAYED WITH DECODED CW TEXT: If the TEXT DEC switch parameter is set to WPM CHK (using VFO B), the speed of on-air CW signals will be shown, along with a small window of CW text. You might see Ò18w. CQÉÓ, where Ò18w.Ó means 18 WPM. Both text decode and WPM display accuracy can be improved by using narrow filtering and by careful adjustment of the ÒTHRÓ (threshold) parameter (set with VFO A when the TEXT DEC switch is pressed).

* RF GAIN CALIBRATION: The K3's hardware AGC circuitry can now be calibrated. This may improve both S-meter and RF GAIN control accuracy. To do RF GAIN calibration, use revision 1.2.7.24 or later of K3 Utility (use the RF GAIN calibration function, under Configuration). This procedure calibrates both main and sub receivers. A signal source is required. Future firmware revisions will further improve accuracy, using the calibration data stored by this procedure.

Misc. Improvements:

* "SK" IS NO LONGER DISPLAYED IN RESPONSE TO NOISE DURING CW DECODE. Incorrect characters are now displayed as ‘*’.

* 6 METER SCANNING NO LONGER PROHIBITED. Scanning is limited to the 6-m U.S. ham band (50-54). Exception: In some countries the K3 won't operate on 6 m at all.

* TTY CENTER FREQ NOW DISPLAYED CORRECTLY: In FSK-D and AFSK-A modes, rotating SHIFT now shows the exact center pitch (when indicated by an asterisk). The four available center pitches are 1000, 1360, 1530, and 2210 Hz. Previously the pitch was

rounded down to the nearest 50 Hz.

For Software Developers:

* "RO" COMMAND (RIT/XIT OFFSET READ/SET) ADDED. This command provides a more direct way to set up the RIT/XIT offset, as an alternative to ÒRUÓ and ÒRDÓ. Set/Response format: ROsxxxx; where s is +/-, and xxxx is 0000-9999.

Troubleshooting Aid:

* KAT3 ÒNOT INSTÓ setting is now global. If you set CONFIG:KAT3 to NOT INST for the present band/antenna, it applies to all bands/antennas. Similarly, if you change the setting from NOT INST to any other setting, all per-band/per-antenna ATU mode data is restored. This change is useful if you need to remove a KAT3 module for troubleshooting.

MCU 3.19 / DSP 2.17, 6-14-2009

* POWER-RELATED CONTROL LOCK: The PWR, MIC, and CMP controls can be locked by tapping '1' in CONFIG:PWR_SET. This is useful in some contests, such as Field Day, where a carefully-set up K3 might be used by multiple operators. Accessing a locked control flashes "LOCKED". SPD/DELAY/MON functions are still accessible. Tapping a locked knob still displays the current parameter value, even though you can't change it.

* AUTOMATIC CW VFO OFFSET ON MODE CHANGE: Allows switching quickly between SSB and CW mode without either you or the other station having to re-tune the VFO (often done on 6 meters and transverter bands). First, locate CONFIG:CW WGHT and tap '5' on the keypad until you see ÒVFO OFSÓ. From then on, when switching to CW mode from any other mode, the VFO will be offset by an amount equal to your sidetone pitch (as set using the PITCH switch in CW mode). If the sideband most recently used on this band is USB, the VFO will be shifted UP; if it was LSB, the VFO will be shifted DOWN.

Note: If you make frequent use of this feature, you may want to use CW reverse on bands where you use USB, and CW normal

on bands where you use LSB. This results in perfect pitch matching when listening to a CW signal and switching from SSB to CW.

* GHZ TRANSVERTER DIGITS are now shown for two seconds on any band change, if applicable (i.e. if transverter frequency is set for > 999 MHz in menu entry CONFIG:XVn RF). This serves as a reminder of the actual band in use, since the MHz digits alone can be ambiguous.

* AM MODULATION: Now closer to 100%.

* TUNING VFO FROM ONE BAND TO ANOTHER WITH BANDS MAPPED OUT: This no longer alters CONFIG:BND MAP settings.

* SYNTH UNLOCK WHEN USING PTT/CW: When using PTT, cancelling CW message play by tapping the key or keyer was sometimes causing the synthesizer to unlock.

* CW SIDETONE STUCK WITH PTT: When using PTT, cancelling CW message play during a CW element was sometimes leaving sidetone on.

* 6M CAN BE PERMANENTLY DISABLED: This is required for some countries. This would normally be done at the factory, but can also be done in the field with a PC program (contact customer support if interested).

* MAX POWER LEVEL NOW 110 W (was 120 W): This is intended to reduce the possibility of excess KPA3 operating current on some bands. This might have occurred when using a high power setting along with low power supply voltage and/or a high load SWR.

(**Note:** The recommended maximum power setting is still 100 W.)

For Software Developers:

* MONITOR LEVEL (ML) COMMAND: MLxxx (000-060 where 000 is OFF, in effect). Applied per-mode.

* IC COMMAND NOW HAS A "TX MSG PLAYING" FLAG. Byte "a" bit **B2**.

MCU 3.14 / DSP 2.16, 5-9-2009

* SPEAKER PROTECTION: If you're set up for stereo speakers (CONFIG:SPKRS = 2), but insert a *mono* speaker plug, the right speaker

output will be shorted to ground. This can cause excess current drain if you turn volume up to high levels. The K3 now detects this condition, automatically turning off the right channel (SPRKS = 1). If the *left* channel is shorted, the K3 will reduce AF gain and flash ÒHI CURÓ.

* CONFIG:XVn RF parameter can now be set up to 24999 MHz (24.9 GHz).

Application programmers: FA & FB get/set can also now handle up to 24999 MHz.

This appears to work with N1MM all the way up. HRD tops out at 4 GHz, but Simon may be working on this.

MCU 3.11 / DSP 2.15, 4-18-2009

* DATA SUBMODE NOW SAVED/RESTORED CORRECTLY: On power up and on some band changes, the correct data sub-mode was getting lost.

* ERROR TONE PITCH PROBLEMS FIXED: The sidetone pitch was getting changed by certain error conditions and when doing TUNE.

* SWITCH TONES NO LONGER GETTING STUCK ON: In AM mode with wide AM bandwidths selected, tapping HI/WIDTH or LO/SHIFT could leave the switch feedback tones on, or omit the second switch tone entirely.

* BALANCE CONTROL MOVEMENT JUST AFTER POWER-UP NOW OK: Someone noticed that if you power up the rig with the sub turned on, then moved BALANCE (SUB AF) before moving AF GAIN, the main receiver AF would be lost temporarily.

MCU 3.10 / DSP 2.15, 4-15-2009

* FASTER EXTERNAL CW KEYING SPEEDS : When transmit is pre-enabled using PTT (i.e., with a footswitch or with PTT under computer control), external keying speeds up to 100 WPM are now possible. (When using CW with VOX, the recommended maximum is still 60 WPM.)

Notes: (1) If you use a computer to control PTT, and wish to do this via the K3's serial I/O jack, refer to the CONFIG:PTT-KEY menu entry.

(2) The maximum attainable CW speed may be lower during heavy use of RS232 polling. Also, higher settings of the transmit delay menu parameter (CONFIG:TX DLY) will also reduce maximum CW speeds.

* TRANSVERTER BAND DECODE CHANGE: The K3 can control up to 9 transverter bands via either a serial output (auxBus) or parallel (BAND0-3). The parallel outputs can select all 9 transverter bands, but the auxBus is now limited to addresses 1-7, matching Elecraft's XV-series transverters. (In all cases, use CONFIG:XVn ADR to specify the address.)

MCU 3.09 / DSP 2.14, 4-9-2009

Misc. Improvements:

* NO AFX KEYING ARTIFACT IN RIGHT AUDIO CHANNEL:

Previously, a short burst of audio might be heard in the right audio channel when keying the transmitter with MAIN:AFX MD set to DELAY x. This was most likely with a strong signal or noise in the passband.

* CW VOX OFF BY DEFAULT ON POWER-UP: Some stations using PC control may inadvertently key the K3 in CW mode on power-up if VOX CW is in effect. If this is an issue at your station, locate the CONFIG:CW WGHT menu entry and tap '4', changing VOX NOR to AUTO OFF. This will make CW VOX default to OFF when the K3 is turned on.

* SQUELCH CONTROL MORE RESPONSIVE: When rotating the RF/SQL pot or changing SQ MAIN/SUB menu entries, squelch updates more quickly.

* PER-BAND POWER SAVED ON VFO A/B SWAP: Per-band power settings (CONFIG:PWR SET=PER BAND) are now preserved if an A/B swap is done with the two VFOs set to different bands.

* RIT OFFSET PRESERVED ON BAND CHANGE: If CONFIG:SPLT SV is set to YES, both the state of RIT/XIT *and* the present offset will be saved on any band change. (Previously, the offset was set to 0 on band change, which was inconvenient when alternating between two different bands and using RIT or XIT.)

* SPURIOUS SIGNAL REMOVAL AND SUB-RX FREQ SHIFT: The use of spurious signal removal (CONFIG:SIG RMV) for the main receiver no longer causes a small shift in frequency of the sub receiver when a mapped-out spur segment is encountered.

* COARSE TUNING EFFECT ON VFO COUNTS/TURN: On exit from

COARSE tuning, the normal VFO counts per turn value (CONFIG:VFO CTS) is now correctly restored.

For Software Developers:

* SQ\$ ADDED (sub-RX squelch control). SQ and SQ\$ work for both FM and non-FM squelch. Squelch control range via CAT or pot is now 0-29. This is different from the K2's SQ control range.

MCU 3.06 / DSP 2.12, 4-1-2009

* SSB POWER CONTROL: Decreased time that SSB power output takes to reach target when PWR control adjusted. Also eliminated drive level change when ATU TUNE is used.

New Feature: All-mode squelch:

* SQUELCH IN ALL MODES: Locate CONFIG:SQ MAIN, then tap '1' until you see "ALL". To use the SUB RF/SQL pot to control both main and sub squelch, set CONFIG:SQ MAIN to =SUB POT. (In this case, MAIN RF will control both main and sub RF GAIN.) If you want independent control of main and sub squelch, set SQ MAIN to a numeric value (0 opens the squelch all the way). SQ MAIN and SQ SUB will then be fully independent. (They can be assigned to programmable function switches if you use them frequently.) In this case MAIN RF GAIN and SUB RF GAIN are independent, using the two RF/SQL pots.

MCU 3.04 / DSP 2.11, 3-25-2009

Misc. Improvements:

* DSP AGC FIXED: You can now use the original fast and slow AGC decay setting (CONFIG:AGC DCY = NOR) if desired. In pileups or when listening to voice signals, try setting AGC DCY to SOFT. This can reduce in-band IMD by 15-25 dB. Also see release notes for rev 3.03/2.10 concerning AGC HLD and overall AGC options.

* TUNING JUMPS DUE TO SPURIOUS SIGNAL REMOVAL: The use of CONFIG:SIG RMV no longer causes frequency tuning errors in USB and CW REV modes.

* MEMORY RECALL: This now preserves all settings that should be

per-band (not per-memory), including PRE/ATTN and sub antenna selection.

* BSET INTERACTION WITH RIT/XIT: Using BSET no longer causes an unwanted change in RIT/XIT settings.

* FIXED FA/FB COMMANDS AND 1-HZ TUNING: Non-zero 1-Hz digits are now preserved when FA/FB commands are received and FINE tuning is in effect.

* ANT NAME FLASH: The antenna name is no longer flashed when A/B or REV are used. It is still flashed on any band or antenna change.

MCU 3.03 / DSP 2.10, 3-17-2009

This is a major firmware release with a number of new features, including:

- Band independence for the sub receiver
- New AGC features especially for use in pileups
- ATU storage of multiple settings on each band, and per-antenna auto/bypass
- Birdie removal menu entry
- Improve behavior of PTT and the TX LED
- Extended transverter frequency coverage with a 10-m I.F.

Details appear below.

New Feature: Band Independence for the Sub Receiver

* MAIN/SUB RECEIVER BAND INDEPENDENCE. If CONFIG:VFO IND is set to YES, then VFO A and B can be set to different bands. In this case BAND UP/BAND DN will only move VFO A, but in BSET mode, they will apply

to VFO B. VFO B can also have a different mode from VFO A. Some RX parameters can be set differently for the sub receiver when in BSET mode, including PRE, ATTN, all DSP controls, and NB (noise blanker) settings.

Limitations: For now, NR, notch, and some other controls remain common to both receivers. Internal text decode (CW, FSK-D, PSK-D) is available only for the main receiver. Scanning still must be set up using both VFO A and B on the same band. Memory recall only updates VFO A if VFO B is on a different band. (Most restrictions will be removed in future revisions.)

New AGC Features

Introduction: All AGC systems modulate in-band signals to some degree, creating IMD if multiple signals are present. But you now have several choices when conditions are difficult: (1) AGC OFF, which eliminates virtually all in-band IMD, but requires overriding of the RF GAIN control. (2) Slow AGC (AGC-S) with a nonzero hold time, typically 0.2 seconds or more (see **CONFIG:AGC HLD** below). This is nearly as clean as AGC OFF, but the AGC will charge on strong signals, reducing gain for the duration of the AGC HLD amount. This can be distracting. (3) Soft-decay AGC (see **CONFIG:AGC DCY**, below, which applies to AGC-S/-F). This recovers much faster than AGC-S with a long hold applied, and produces only a little more IMD. In the case of AGC-F (fast), soft decay will result in slower recovery time between code elements than normal decay (nor), but it will still be much faster than AGC-S with a hold time applied. (4) Normal-decay AGC. This is the traditional DSP-based AGC decay characteristic, and it will create a lot more IMD than the other alternatives. (An application note showing the effect on actual signals is pending.)

* AGC DCY MENU ENTRY (AGC decay type): Allows you to select "Soft" or normal AGC decay characteristic. When AGC DCY is set to "Soft", both slow and fast AGC will create less in-band IMD (intermodulation distortion) in multi-signal situations (e.g., pileups). You can assign AGC DCY to a programmable function switch (PF1/2 hold, or M1-4 tap or hold) if you need to turn it on/off quickly.

* AGC HLD MENU ENTRY (slow AGC hold time): AGC HLD now applies to CW mode (originally it applied only to voice/data). AGC HLD may reduce receive IMD caused by normal AGC-S/AGC-F decay times. Settings of about 0.3-1.0 seconds should improve copy when many closely spaced signals are present, as in a CW pileup. **No effect on AGC-F.**

New ATU (KAT3) Features

- * MULTIPLE KAT3 ATU DATA SEGMENTS PER BAND/PER-ANT.: 10 kHz per segment on 160 m; 20 kHz on 80-12 m; 50 kHz on 10 m; 200 kHz on 6 m. This keeps narrowband antennas in tune across the full ham band. **Note 1:** You **do not** have to go through each band and do ATU TUNE on every segment. The K3 will use the saved LC data segment closest to your present VFO location. **Note 2:** You can erase all of the stored LC data for a given band by tapping CLR in the CONFIG:KAT3 menu entry.
- * AUTOMATIC KAT3 LC NETWORK UPDATE ON TRANSMIT: Each time you transmit, the K3 first determines whether you've moved the VFO closer to another stored ATU data segment. If so, it will re-load the KAT3 with this data, and flash the ÒATUÓ icon twice, briefly. You'll hear one or more relays on the KAT3 change state. This will not interrupt transmit.
- * ATU MODE STORED PER-BAND, PER-ANTENNA: You can now set up the KAT3's mode (AUTO, BYPASS, etc.) on a per-band/per-antenna (1/2) basis. This is very useful if you have well-matched antennas on some bands, or a dummy load connected to one of the ANT jacks.

New Feature: Spurious Signal Removal

- * SPURIOUS SIGNAL REMOVAL: *Fast-tuning* ÒbirdiesÓ can in some cases be eliminated using the new ÒSignal RemovalÓ feature (CONFIG:SIG RMV). We recommend that this be attempted only on birdies that can be heard with an antenna connected. **STEPS:** (1) Set up the receiver for a desired band, and select the mode you'd normally use in the target band segment. (2) Locate a birdie to be removed. A birdie is considered Òfast-tuningÓ if a small change in the SHIFT control (e.g. 50 Hz) moves the birdie about 500 Hz or more (sometimes this small shift will move it completely out of the passband). Such birdies result from UHF harmonics of the VFO. *If you do test a birdie using SHIFT, be sure to return SHIFT to its normal setting before continuing, because the value of SHIFT affects the birdie frequency.* (3) Locate the CONFIG:SIG RMV menu entry, and change the parameter from **NOR** to **0**. This will save necessary information about the birdie, including the present VFO frequency, mode, filter, and SHIFT value.

(4) Try different values of SIG RMV, starting with -1 or 1, to see if the birdie can be removed. Greater values (- or +) will move the birdie farther out of the passband, but will also result in a greater change in the background noise as you tune across it. **IMPORTANT:** Each time you change SIG RMV, exit the menu and see if the birdie has disappeared. Each SIG RMV value applies to a 100-Hz VFO segment, e.g. from 28135.**30** to 28135.**39**, so you'll have to tune slowly through that 100-Hz range using 10-Hz steps to make sure the birdie has been completely removed. Once you're finished, you may still hear a slightly tuning artifact as you tune through this range. **NOTE:** In most cases, you'll need to apply SIG RMV to at least two adjacent 100-Hz VFO segments. Also, if you use more than one filter or SHIFT setting in the present operating mode, you'll probably need to map out the birdie more than one time. **TO UNDO SIG RMV:** If you tap CLR while you're in the SIG RMV menu entry, all birdie information for the present band will be permanently deleted. **SSB MODE ALTERNATIVE:** In SSB modes, simply leaving AUTO NOTCH on may be effective.

Limitations: SIG RMV is experimental. It applies only to the main receiver, at present, and only in CW/SSB/DATA modes. Do not attempt to remove birdies on transverter bands; instead, remove them on the I.F. band used. On each band from 160-6 m, up to 60 birdies can be removed. But as mentioned above, each one may have to be mapped out from adjacent VFO segments as well as for different filter and SHIFT settings. So the practical number of birdies that can be removed is more like 5 to 20 per band. A small audible tuning artifact may remain after removing strong birdies. Changing REF CAL or your sidetone pitch may make birdies re-appear. In this case, you might want to tap CLR within SIG RMV to delete the data for the present band, then start over.

Misc. improvements

* SSB/DATA POWER OUTPUT CONTROL: Power-setting accuracy has been significantly improved over previous releases.

* AFSK A TRANSMIT NOISE ELIMINATED: Under certain circumstances,

such as with DUAL PB turned on, the AFSK A transmit signal could be modulated by low-level audio noise. This has now been eliminated.

* PTT-CW RELEASE FIXED: When PTT is used to òarmó CW transmit, e.g. with

a footswitch, releasing PTT in the middle of keying now disables transmit.

Note: This does not apply if VOX is turned on in CW mode. In this case, the keying inputs are always òlive,ó i.e. you can hit the key to transmit whether PTT was used or not.

* TX LED: This LED now only turns on if power output is actually enabled.

* EXTENDED TRANSVERTER BAND COVERAGE: When 10 meters is used as a transverter-band I.F., the upper end is no longer limited to 30 MHz. In the case of a transverter band set up for 2 meters (nominally 144-146 MHz), this allows tuning a bit higher than 146 MHz, if desired. The 10-meter band-pass filter falls off pretty quickly above 30 MHz. But the extended range may be useful for hitting repeaters with in/out in the 146 to 147 MHz range.

For software developers

* IC COMMAND SHOWS SUB ON/OFF STATUS: Byte b, bit 0. This is more reliable than the SUB ON bit in the DS response. òICó also as the advantage that "K31" mode need not be in effect.

MCU 2.82 / DSP 2.00, 2-9-2009

Data Mode Changes:

* AFSK MODE TRANSMIT FILTERING: Some K3 owners have reported hearing noise on their RTTY transmit signal when using AFSK-A mode. Possible sources of noise include RFI, ground loops, low AF level, or poor mark/space transition shaping by software. The effects of noise from many sources can be eliminated by using a narrow, constant-delay transmit filter (DSP).

To enable this filter, set CONFIG:AFSK TX, to FIL ON (default is OFF).

* SSB/DATA-A/AFSK-A TRANSMIT POWER LEVEL: Power output in these modes now more closely the requested power. Because of this, we recommend setting CONFIG:TXG VCE to 0.0 dB after loading this release, then adjusting the value only if necessary.

* DATA MODE ALC METERING: ALC metering for DATA-A and AFSK-A modes has been adjusted to make the transmit audio level easier to adjust.

As before, the recommended audio level for transmission is 4 to 5 bars.

3 bars will appear as soon the minimum required level for good S/N ratio has been reached.

* FSK POLARITY MENU ENTRY: Setting CONFIG:FSK POL to 0 reverses RTTY data polarity (**applies only to FSK-D mode transmit**) . **Note:** If you use

the ALT switch to select DATA REV mode, this reverses *both* RX and TX tones, in both AFSK-A and FSK-D modes. This should rarely be required.

FSK POL can be used by itself or in combination with DATA REV.

Misc. Changes:

* DVR MESSAGE CANCEL WITH PTT OR VOX: Both one-time and repeating DVR transmit message play can now be cancelled cleanly with either PTT or VOX.

* AM MODE SPEECH COMPRESSION: Speech compression is now available in AM mode. This can add punch to your AM signal. As with any type of compression, it should be used only when necessary.

* FM TX DEVIATION: This is now more accurate. Previous versions could underdeviate by as much as 1 kHz. Setting is now accurate from 3.0 kHz to 5.0 kHz of deviation when modulated by 1 kHz tone with 5 bars of ALC indicated.

For software developers:

* ÒBNÓ COMMAND ADDED (Band Number). GET only. This command returns

the K3's present band **number** (0-10 = 160 m - 6 m, 11-15 reserved for future use, 16-24 = XVTR bands 1-9). It is useful for software applications that need to know if the operator has tuned the VFO across a logical band boundary. This eliminates the need for applications to keep track of what the K3's internal band boundaries are.

MCU 2.80 / DSP 1.99, 1-23-2009

- * AM POWER LEVEL NO LONGER DRIFTS: AM power setting is now more accurate, and doesn't change over time.
- * AM TRANSMIT SIGNAL NO LONGER OVERMODULATED: AM ALC and audio signal levels have been adjusted to provide a very clean transmit signal.
- * DVR TERMINATION VIA PTT: Activating PTT will immediately stop DVR transmit message playback.
- * CWT (CW TUNING AID) ON/OFF STATE SAVED: If you turn CWT on, it will always turn on when you return to the applicable mode (e.g. CW).
- * MANUAL ATU L/C CHANGES ARE SAVED (per-band, per-antenna, just like when doing an auto-tune). Manual ATU adjustment is possible when CONFIG:KAT3 is set to **LC SET** (see owner's manual). Previously, manual L/C changes were lost when the KAT3 mode was returned to **AUTO** or **BYP**.
- * ALC METERING AVAILABLE IN FM MODE: Previously, in FM mode the ALC meter scale was fixed at 7 bars.
- * CROSS-MODE SPLIT : When using cross-mode SPLIT (e.g. LSB/USB) with the sub-RX ON, the use of TUNE would sometimes result in an incorrect sub receiver synthesizer frequency.
- * SPOT and PITCH switches work correctly with switch feedback tones enabled. Switch feedback tones are not used for these switches since a tone is generated anyway. Previously, the sidetone would sometimes not be heard.
- * XVx MENU ENTRY BEHAVIOR CORRECTED: Previously, adjusting these menu entries would sometimes change the mode or frequency of the VFOs.
- * VFO CTS MENU ENTRY: A change in the VFO counts-per-turn setting now takes effect immediately, rather than requiring a mode change or power cycle.

MCU 2.78 / DSP 1.98, 1-8-2009

- * SIGN-ON BANNER SUPPORT (for your callsign, etc.): If you specify a sign-on message (using K3 Utility), it will be displayed when you turn your K3 on. This might include your call sign, serial number, etc. K3 Utility revision 1.1.12.29 or later is required. Click on the **Configuration** tab, then click on **Edit Sign-On**

Banner. Up to 22 characters can be entered. If you delete all characters from the message, no banner will be shown.

Misc. Changes:

* SSB SPLIT TX AUDIO PROBLEM CORRECTED: In certain cases (ESSB, VFO A/B on different modes, or SUB turned on), going into SPLIT mode would result in no SSB transmit audio, or an incorrect transmit audio passband.

* VFO COUNTS PER TURN CORRECT AFTER EXIT FROM COARSE TUNING:

Previously, if you had CONFIG:VFO CTS set to 400 or 200, selecting COARSE tuning would leave VFO counts/turn at 100 even after switching to another tuning

rate. (100 counts per turn is used for coarse tuning due to the large step sizes.)

* SUB/MAIN AF BALANCE CONTROL: Main and sub RX audio are now correctly

restored when the sub is turned on/off, etc. Previously, either receiver might have remained muted after sub on/off when SUB AF was set up as BALANCE.

* DVR WITH COMPUTER CONTROL (HRD, ETC.): Running HRD (and some

other PC applications) no longer terminates DVR record/play. Some programs were polling every second or so for the DVR's firmware revision, which stops the DVR. The K3 MCU now handles this command in all cases without DVR interruption.

* AM DSP BANDWIDTH DISPLAY NOW SHOWS *AF* BANDWIDTH, NOT IF. We

originally showed the IF bandwidth in AM mode since some operators might be thinking about the underlying AM-mode implementation (i.e., the IF bandwidth has to be twice the AF bandwidth in this mode). But this was causing a lot of confusion, and was inconsistent with the way the DSP bandwidth control works in

other modes, where the *AF* bandwidth is displayed. Also, LO and HI CUT show

AF cutoff points – not IF – even in AM mode. So we now consistently define the

function of all DSP controls as showing AF frequencies/bandwidths. Note: In AM

mode, tapping XFIL will still show the *crystal filter* bandwidth, not the DSP BW.

So if you select a 6-kHz crystal filter by tapping XFIL, you'll see 6.00 displayed

(for example). But the DSP width control now be at a starting point of 3.00 kHz.

Also see related change to 0FW0 remote-control command.

For software developers:

* AM-MODE "FW" COMMAND CHANGE: The filter bandwidth command (0FW0)

was reporting the IF bandwidth in AM mode (multiplying by two) which was confusing

for users of some PC applications. It now reports the DSP (AF) bandwidth in AM

mode. As with the manual WIDTH control, the IF bandwidth is set to approximately

twice the AF bandwidth when an 0FW0 set command is sent. (Note that 0K310 mode

must be in effect in order to use 0FW0 to get/set actual bandwidths.)

* ENTERING SPLIT CROSS-MODE VIA "FT;": This no longer results in icon flash,

so no dummy SWT command is needed to cancel it. (When split is turned on using the K3's SPLIT switch, the cross-mode warning flash is still present.)

K3 Factory Test Changes:

* LOST KPA3 12V SENSE THRESHOLD IS NOW 0.2 V: This allows for possible

future changes to the 12V PA sense circuitry (diode, etc.).

* ADC REF MENU PARAMETER NOW SAVED ON MENU EXIT: Previously it

was saved only on power-down.

MCU 2.76 / DSP 1.98, 12-21-2008

* POWER-ON AF NOISE BURST: This should now be eliminated.

* **DIGIT 2 SWITCH TONE FEEDBACK RESTORED.** The '2' key on the numeric

keypad now provides tone feedback when used for numeric entry or within menu entries. There's no tone when it's used as ÒREVÓ (temporary A/B VFO reverse).

* **SSB TX AFTER VFO A/B SWAP:** Transmit filter settings are now correct after any A/B swap, regardless of the modes of VFO A and B. This had been noted by some customers as a problem on power-up, but it could occur anytime the VFOs were in different modes at the time of an A/B swap.

* **INDEPENDENT PREAMP AND ATTN FOR SUB RECEIVER:** The preamp and attenuator settings for the receiver are now independent of main. On each band, you can set up the sub's preamp/attenuator as desired using BSET. The sub's preamp/attenuator are separate even in diversity mode, where you'll often be using a lower-gain antenna for the sub receiver. **Note:** A second tap of A>B within the 2-second window still copies all main receiver settings to the sub, including preamp and attenuator.

For software developers:

* ÒFR0Ó COMMAND (SPLIT CANCEL): Now correctly restores the VFO A arrow icon.

* **CONFIG:KPA3 MENU ENTRY:** The parameter for this menu entry is now accessible via the ÒMPÓ command.

* ÒFAÓ/ÓFBÓ commands and loss of PLL lock: Large FA/FB frequency steps were, on rare occasion, causing loss of PLL lock. This has been corrected.

* Added "PA\$" (sub RX preamp) and "RA\$" (sub RX attenuator) commands. This is in conjunction with the sub preamp and attenuator settings now being Independent of main (see above). During BSET, both return Ò?;Ó at present.

MCU 2.73 / DSP 1.98, 12-9-2008

* RX EQ is now applied to both main and sub receivers.

* TUNE NO LONGER CANCELS AUTO-NOTCH.

* **CONFIG:ADC REF MENU ENTRY:** This allows the operator to calibrate the voltage reference used by the K3 to measure and display certain values,

such as the rig's supply voltage. **ADC REF calibration is optional but recommended.** First, disconnect anything attached to the ACC jack. Next, locate the CONFIG:ADC REF menu entry. It will initially show **5.00** volts as the reference voltage. Using a DMM set to DC volts, measure the actual voltage at pin 2 of the ACC jack. This must be done **while the ADC REF parameter is being displayed.** (The (-) probe of the DMM should go to the K3's chassis ground, e.g. at the GROUND lug.) Finally, use VFO A to set the ADC REF menu parameter to what you measure at pin 2.

For software developers:

* ÒCPÓ COMMAND ADDED (speech compression setting).

* Auto-report (AI2 mode) added for the ÒMGÓ command (mic gain).

MCU 2.72 / DSP 1.98, 12-9-2008

Misc. Changes:

* LINE OUT INCLUDES TX AUDIO: LINE OUT (**nor** menu setting) now includes

transmit sidetone and speech/data monitor audio.

* IMPROVED TX PASSBAND FLATNESS FOR PSK31: When operating in PSK31

mode via a PC, high-pitched audio tones are no longer attenuated more than low tones.

Support for Digital Voice Recorder option (KDVR3):

Note: The following information is more accurate than the DVR instructions in the

K3 rev D owner's manual.

* DVR ICON: The DVR icon (dual arrows--above the S-meter) turns on whenever the DVR is in use. The icon flashes slowly during all record operations, and quickly during play.

* DVR TX MESSAGES: Message record, play and repeat are functional. (Message chaining will be added in a subsequent release.) To start voice message record, tap REC, then tap M1-M4. Record will start immediately. Tap M1-M4 again

to stop recording. To play a voice message, tap M1-M4. To repeat a voice message

(e.g., a CQ), *hold* M1-M4 rather than tap. Message play or repeat can be cancelled at any time by tapping REC.

* DVR RX LOOP: Hold AF REC to start receive-audio recording. Hold AF REC

again to stop record. Up to 90 seconds of audio can be recorded; beyond this, earlier audio will be overwritten. Hold AF PLAY to start playback; press any switch to stop. VFO B will show the playback position in seconds, relative to the most-recently recorded audio segment. During PLAY, you can move forward/backward through RX audio loop buffer by rotating VFO B. An asterisk (*) beside the seconds counter shows the extent of the most recently recorded segment. **Note:** It is OK to record received audio continuously; this might be useful as a way of catching audio events that you wish to examine later.

Record will continue even if you transmit. However, at present, silence is recorded for the duration of any transmission.

* DVR RX LOOP PLAY IN TX MODE. First, enter voice transmit mode by holding

PTT or tapping XMIT. Then hold AF PLAY to start playback, and press any switch

to stop. CMP (speech compression) is automatically disabled. **Note:** Playback volume of the RX loop buffer during TX mode is not yet adjustable.

For software developers:

* VOX STATUS ADDED TO ÒICÓ CMD (separate flags for CW keying ‘VOX’ and voice/data audio VOX).

MCU 2.67 / 1.96, 11-12-2008

* MAIN/SUB BALANCE CONTROL: If CONFIG:SUB AF is set to BALANCE, then the SUB AF GAIN control becomes a main/sub AF balance control when the sub receiver is turned on (including diversity mode). In this case the MAIN AF GAIN controls the AF gain level for both receivers. When SUB AF is at 12 o’ clock, both receivers will be at full volume (main left, sub right). If SUB AF

is rotated fully counter-clockwise, you'll hear only the main receiver. If it's rotated fully clockwise, you'll hear only the sub receiver. At intermediate settings you'll hear both. A BALANCE control is very useful for contesting and split operation. But it can also save a lot of AF gain control tweaking (i.e., matching main and sub), since MAIN AF controls both main and sub receiver audio.

* AGC-OFF AF LIMITER: An adjustable AF output limiter has been added for operators who turn AGC off. This can protect your ears if a large signal appears. Signals or noise above the threshold will sound highly distorted due to the limiting action, reminding you to back down the AF or RF gain. The associated menu entry, CONFIG:AF LIM, defaults to NOR. Typical settings for those who often turn AGC off are 17 to 23, but some experimentation will be required.

* DIGOUT0 SIGNAL (ACC connector): This now behaves as described in the owner's manual. When a transverter band is selected that is configured for low-power operation (i.e., .01-1.50 mW, and using the KXV3's XVTR IN/OUT jacks), DIGOUT0 provides a low-resistance path to ground that could be used to

activate a small relay or other circuitry. At all other times the DIGOUT0 line will float (high-Z). If all transverter bands are configured for low power, then DIGOUT0 can be used as a transverter band selected signal.

* POWER LEVEL ON XVTR AND HF BANDS: Switching between HF and transverter bands no longer modifies the present HF band power setting.

MCU 2.64 / 1.96, 11-5-2008

* RX ANT HOLD = sub RX antenna switch (if sub is installed). Shows AUX or MAIN.

* SUB ANT SAVED SEPARATELY FOR DIVERSITY/NON-DIVERSITY.

* DVR TX MSG RECORD/PLAY (incomplete).

MCU 2.63 / DSP 1.95, 11-04-2008

* NORM SWITCH ALLOWED DURING TX: The NORM switch function (receive

passband normalization, e.g. 400 Hz in CW mode) can now be accessed during transmit mode. It takes effect after the K3 returns to receive mode. This is

especially useful for CW operation.

* AM COARSE VFO TUNING RATES: Now 1, 5, 9, and 10 kHz.

* AM TRANSMIT: CONFIG:TXG VCE no longer affects AM Tx Levels.

* SPLIT COMBINATIONS AVAILABLE: **Cross-mode** SPLIT operation is possible

with any combination of CW and SSB for VFO A and B. **Same-mode** SPLIT is possible in all modes except PSK-D.

* CROSS-MODE SPLIT INDICATION: If you turn on SPLIT with VFO A and B in

different legal modes (e.g. CW and SSB), the K3 will remind you of VFO B's mode by flashing it (as well as the VFO B TX arrow). This reminder can be cancelled by tapping any switch, key, or PTT. The reason for the reminder is that operators usually enter cross-mode split by accident. If so, cancel the reminder flash, then use BSET to change VFO B's mode, or tap A>B to copy mode A to mode B.

* COMPRESSION RANGE: Some operators asked for a higher COMP (speech compression) setting to add punch under certain conditions. It can now be set from 0-40. We still recommend lower settings (0-20) for normal operation.

For software developers:

* ÆFW\$ ADDED (direct sub/VFO B filter bandwidth).

* ÆSM\$ ADDED (direct sub-receiver S-meter read).

* "DV" (DIVERSITY) COMMAND: DV0 (off), DV1 (on). Also turns sub off/on. To turn

on the sub but not diversity, use an ÆSWT\$ command (verify SUB status with ÆDS\$).

* COMMANDS AVAILABLE DURING BSET: "IF", "FA", "FB", "MD", ÆMD\$, and "DT"

(GET only). ÆFW and ÆFW\$ work in BSET except during diversity (TBD).

MCU 2.60 / DSP 1.94, 10-29-2008

* SPLIT operation is now allowed in FSK-D, PSK-D, and CW-in-SSB modes.

MCU 2.59 / DSP 1.94, 10-28-2008

* SWITCH TONES NOW AVAILABLE: If CONFIG:SW TONE is set to ON, tapping

or holding switches produces audio tones corresponding to the switch state. This supplements the normal tactile feedback of the switches.

* DIVERSITY MODE: Corrected issues related to adjusting receive controls during transmit.

MCU 2.58 / DSP 1.94, 10-28-2008

New Features:

* FAST BAND SWITCHING USING KEYPAD: We've added a band select mode for memories 0-9. First, set CONFIG:MEM 0-9 to BAND SEL.

You can then use V>M to assign individual bands to keypad switches 0-9.

For example, use BAND UP/DN to get to 160 m, tap V>M, then tap #1.

From then on, tapping M>V, then #1, will take you to your last-used frequency on 160 m, just as if you had used the BAND switches. Up to 10 of your favorite bands can be assigned to keypad switches, including transverter bands.

The behavior of memories 10-99 and the per-band quick memories (M1-M4) will be unchanged.

* MAPPING OUT SELECTED BANDS: You can now remove one or more bands

from the BAND UP/DN rotation using the CONFIG:BND MAP menu entry. Once

you've located BND MAP, use BAND UP/DN to select bands, and set them to IN or OUT using VFO A. (Works with transverter bands, too.) You can still get to mapped-out bands using memory recall, direct frequency entry, or computer-control commands (FAB and FBO).

Miscellaneous:

* VOX CAN BE TURNED OFF DURING VOICE TRANSMIT: This is useful if you're using VOX and have a sudden increase in shack noise that activates transmit.

* MSG PLAY IN SSB MODE FIXED: In revision 2.57, tapping M1-M4 to play a message in SSB modes was setting the CW pitch to 0 Hz. This has been corrected.

For software developers:

* "RX" COMMAND AND TUNE: ÒRXÓ will now exit either an XMIT or TUNE

condition.

* MANUAL BAND CHANGE IN AI1 and AI2 MODES: Multiple rapid presses of

BAND UP or BAND DN were sometimes inserting band-change response data for intermediate bands into the outgoing host command buffer. Now only the data for the final band is sent.

MCU 2.57 / DSP 1.94, 10-24-2008

Major changes and new features:

* SSB POWER CONTROL IMPROVEMENTS: (1) No jumps in power while rotating PWR control during transmit. (2) No upward spike when crossing QRP/QRO boundary. (3) No loss of SSB TX drive level when tapping A/B, changing modes, or doing an ATU TUNE. (4) These improvements may also lessen the effect of ÒspikingÓ external amplifiers, but further work on the ALC routine is planned.

Note: The SSB drive does still get reinitialized to match the CW level if you do a TUNE (this is desirable). But it also happens if you change bands or recall a memory (that will be fixed in a later release).

* FIRST **A>B** TAP COPIES MODE (if VFO A and B modes are different). This

should greatly reduce the chance of having VFO B in the wrong mode when the operator later goes into SPLIT. (Those who want to do cross-mode split can still set up VFO B differently using BSET mode, and should avoid A>B.) Once the VFO modes are the same, operation of A>B is the same as before: A single tap copies only the frequency, while a second tap copies everything.

* SPLIT CAN BE USED IN DIVERSITY MODE: See details below.

* PSK31 (PSK D MODE) TRANSMIT IMPROVEMENTS: Eliminated erroneous characters during CW-to-PSK31 transmit when using the keyer paddle. Also greatly improved PSK31 transmit speed by removing all extraneous ÒzerosÓ from the data stream.

* MARS operation now possible on 40 m up to 7550 kHz.

VFO Linking, Sub RX, Diversity Mode, and SPLIT:

* **SPLIT CAN BE USED IN DIVERSITY MODE:** During SPLIT, VFO B is only the

transmit frequency. VFO A controls both receivers. So you now have a choice when using SPLIT with the sub receiver: diversity receive, or listening to both your

RX (main) and TX (sub) frequencies simultaneously. Also see BSET note below.

* **VFO A-B LINKING:** This is now indicated by slowly flashing the VFO B kHz decimal point.

* **A/B** and **REV** CAN NOW BE USED IN DIVERSITY MODE. In both cases, the

VFOs are swapped, allowing you to listen in diversity mode on VFO B's frequency.

* **BSET IN DIVERSITY MODE:** If you use BSET in diversity mode, you'll now hear the main RX in the left ear and sub RX in the right. This is useful when using

SPLIT with diversity, as it allows you to override diversity mode temporarily and

listen to both your RX and TX frequencies.

* **VFO B NOT LOCKED WHEN LINKED TO VFO A:** This means the VFOs can

be linked but at different frequencies. A fixed offset can be established using VFO B, and will be maintained as you tune VFO A.

* **VFOs NOT LINKED IN DIVERSITY MODE:** VFO A is used to update both synthesizers (main and sub), but VFO B is now free to be used as a SPLIT TX frequency (see below). In DIVERSITY mode, the VFO A kHz decimal point slowly flashes, as before.

Miscellaneous:

* **MESSAGE PLAY FIXES:** There were a few issues with CW and DATA message buffer playback, including occasional truncated characters when chaining in CW mode, and inconsistent behavior when chaining.

* **MORE ACCURATE AM-MODE POWER LEVEL.** Also slightly higher modulation percentage.

* **INTERNAL 2-TONE TEST GENERATOR** now works with 2.7 as well as 2.8

kHz crystal filters, and the tones are now correct when used with both LSB and USB.

* KEY OUT disabled sooner on power-up: Previously, KEY OUT was active for about 3 to 4 seconds on power-up. This has been reduced to under one second. In any case, no RF is present during this period.

For Software Developers (see K3 Programmer's Reference, rev B14):

* ÒDSÓ (VFO A DISPLAY READ): This command now correctly handles all of the

RX EQ / TX EQ Òmini-bar graphÓ levels as displayed in the main menu. The bar

graph level 1 character, if it appears in the ÒDSÓ response string, is now converted

to an underscore rather than a semicolon. This preserves the semicolon as strictly a command terminator.

* "DT" COMMAND ADDED (VFO A DATA sub-mode read/set). "MD" is still used to set norm/rev.

* "IF" COMMAND INCLUDES DATA SUB-MODE (K31 must be in effect).

* "IC" COMMAND ADDED (ICON and MISC STATUS): Provides state information on many functions, including BSET, TX TEST, VFO linking, diversity mode, sub RX antenna, full/semi QSK, dual-passband CW, dual-tone FSK filtering, ESSB, nose gate, FM PL tone on/off, etc.

* ÒLK\$Ó COMMAND ADDED (VFO B LOCK).

* ÒTQÓ (TRANSMIT STATUS QUERY) now returns 1 consistently when the K3 is in transmit mode.

* MORE MENU ENTRIES ACCESSIBLE WITH ÒMPÓ COMMAND: KAT3, VCO MD, and AGC THR are now available. See MN command table for details.

* KY (keying) remote control command now handles CR, LF, TAB and other ASCII characters including: [\] ^ _ ' All of these characters are useful in PSK D mode. They're ignored in other modes, except that ' _ ' becomes an "AA" prosign in CW mode.

* Prosign mapping (e.g., Ò=Ó conversion to ÒBTÓ) is now disabled in PSK D and FSK D modes. This allows all ASCII characters to be transmitted normally. (Prosigns can always be sent using the alphabetic characters themselves

in these modes.)

MCU 2.46 / DSP 1.94, 10-3-2008

* 40 METER PA CURRENT REDUCTION: This revision corrects the low-pass filter configuration used on 40 m. The 10/12 LPF, not the 6 m LPF, is now used in-line with the 40 m LPF. This optimizes return loss, keeping current at the target level at 100 W (about 20 A).

* NOTE ON AM COMPRESSION: Starting with MCU 2.45/DSP 1.92, speech compression has been disabled in AM mode. We hope to create a more effective compressor for AM in a future revision; the original was adding distortion without increasing *ÖpunchÓ*. On the other hand, the available AM modulation level

has been increased, and we're better utilizing the mic AGC system in this mode.

MCU 2.45 / DSP 1.92, 9-29-2008

* TRANSMIT NOISE GATE ADDED: The TX noise gate can be used to suppress

transmitted audio below a certain level, e.g. a noisy fan (not the one on the K3, of

course). To use the noise gate, locate CONFIG:TX GATE, tap '1' to turn it ON,

then use VFO A to set the desired threshold. Since there's no visual indication that

transmit audio is below the threshold, you should adjust it using the transmit voice

monitor (MON), ideally using headphones. Set the threshold high enough to cut off

transmit audio due to shack noise, but not so high that it causes your voice to drop

out too frequently. The TX GATE threshold can be adjusted in TX TEST mode.

* TRANSMIT INHIBIT (TX INH) FUNCTION IMPROVED: Activating the TX INH input

on the ACC jack now asynchronously suspends RF output. It has no interaction with transmit sequencing. When TX INH is active, the only indication is that the

TXO LCD icon flashes, as in TX TEST mode. This should closely match the transmit

inhibit logic of other transceivers.

* COARSE TUNING CORRECTED: (1) Downward tuning with COARSE increments in

effect occasionally resulted in the synthesizer unlocking, especially in AM mode with

9-kHz European broadcast band increments. (2) Tuning down to the low end of the K3's tuning range would cause quantization. For example, if you were at 505 kHz

with 9 kHz steps selected and tuned downward one tic, the VFO would go to 500 kHz, and the next upward tic would be 509 kHz. Both of these problems have been corrected.

* VOX=OFF REMINDER: Whenever you change the VOX setting from ON to OFF

in CW mode, then sometime later hit the key, you'll see a one-time VOX=OFF message. This is a subtle reminder that VOX must be turned on in CW mode to enable hit-the-key operation. Otherwise you have to arm the transmitter by tapping XMIT or by using PTT. (This has always been the case for the K3, and

most rigs behave in the same way.) We decided to add this reminder message because

operators not familiar with VOX for CW have occasionally turned it off, only to wonder

later why the rig won't transmit in CW mode.

* TRANSMIT DISABLED DURING FIRMWARE LOADS: You cannot key the transmitter during firmware loads, via KEY IN, PADDLE, PTT, XMIT, VOX, or

computer commands.

For Software Developers:

Note: Refer to the K3 Programmer's reference, rev. B10 or later.

* "OM" COMMAND ADDED: Shows which K3 option modules are installed.

* "MP" COMMAND ADDED: Menu parameter direct read/set. Only applies to selected menu entries, as listed in the programmer's reference.

* "MG" COMMAND ADDED: Mic gain read/set.

* "MD\$" COMMAND ADDED: Sub RX/VFO B mode read/set.

* "IS;" COMMAND ADDED (I.F. shift). Note: In diversity mode, an IS or FW command

will be sent to both main and sub. In AI2 mode, moving the SHIFT or WIDTH controls

will generate both IS and FW responses.

* `FW0000x` form of the FW command can now handle x = 1 through 5 (requires

"K30" and "K22" be in effect; see programmer's reference.

* Added the following AI2 responses: PC, AG, AG\$, RG, RG\$, NB, NORM (FW).

MCU 2.38 / DSP 1.90, 9-7-2008

* RIT CLEAR COMMAND: The `R` remote-control command now correctly clears the RIT offset. It would sometimes do the equivalent of a `long-hold` of the CLR switch, copying the RIT offset to VFO A before clearing the offset.

MCU 2.37 / DSP 1.90, 9-2-2008

* FIRMWARE UPGRADE PROCESS IMPROVEMENT: When upgrading firmware,

MCU and DSP code versions may temporarily become incompatible, resulting in error messages during loads. These spurious errors are now suppressed, resulting in a cleaner upgrade process, especially when upgrading from much older revisions.

MCU 2.36 / DSP 1.90, 9-1-2008

* SUB/MAIN AF GAIN EQUALIZED.

* VCO CAL improved to make synthesizer alignment easier.

MCU 2.34, 8-29-08

* CORRECTED SHIFT CONTROL DISPLAY. Center frequency was
Incorrect in some cases.

MCU 2.33, 8-28-08

* DSP FILTER POSITION CORRECTED: At some bandwidth and SHIFT settings,

the DSP IF was shifted downward. Especially noticeable in CW mode.

* **SHIFT CONTROL CW CENTER FREQ DISPLAY:** If you're using a CW sidetone

pitch that's not at a 50-Hz boundary, it will now be displayed accurately when the

SHIFT control is centered (i.e., when the asterisk appears).

MCU 2.32, 8-28-08

* **CORRECTED ESSB/SSB PASSBAND ERROR** (introduced in MCU rev. 2.31).

MCU 2.31 / DSP 1.89, 8-28-08

New Features and Enhancements:

* **CW SIDETONE INCREMENTS NOW 10 HZ** (originally 50 Hz).

* **RIT CLR** switch now works during transmit in all modes and at any time.

* **RIT CLR MENU ENTRY:** You can use this menu entry to select ÒUNDO ONÓ or

ÒUNDO OFFÓ. OFF is the default. When ÒONÓ, tapping CLR will alternate between

0.00 and the present RIT/XIT offset, if any.

* **DIVERSITY RECEIVE MODE:** If you have the sub receiver (KRX3 option) installed,

you can take advantage of Òdiversity receiveÓ by using two separate receiving antennas.

This can improve signal copy during fading, and adds a spatial (L/R) effect to signals.

DIVERSITY MODE further enhances this capability by slaving the sub receiver's mode, filter settings, and VFO to the main receiver. To enter diversity mode, hold

SUB until you see ÒDIVRSTYÓ on VFO B (about 2 seconds). The kHz decimal point

of the VFO A display will flash slowly as a reminder that diversity mode is in effect.

Notes on Diversity Mode:

1. Entering diversity mode switches the sub receiver to its AUX antenna source. If you don't hear any right-channel audio, you probably don't have an antenna connected to the sub's AUX input. Refer to the owner's manual

or KRX3 manual for information on sub receiver AUX antenna configuration.

2. If your main and sub receiver have 5-pole crystal filters with differing frequency offsets, you may hear a slow phase modulation in the received audio at some VFO frequencies. The only way to eliminate this effect is to use 5-pole filters with

matched offsets (available on request; contact Elecraft) or use 8-pole filters, which have no offset.

Miscellaneous changes:

* DUAL PB CW MIN CONTEXT BANDWIDTH NOW 400 Hz. In high-QRM situations,

a 400 Hz or 500 Hz crystal filter may be very useful as a limit to the context bandwidth.

Note that the pedestal effect (-24 dB context filter) becomes more of a sloped response as the context bandwidth is reduced.

* DATA TX ALC IMPROVEMENTS. PWR control is now more responsive during

transmit in all DATA modes.

* FM SQUELCH THRESHOLD: Closely matched between main and sub receivers.

* NOISE BLANKER ON/OFF ON BAND CHANGE: The DSP noise blanker wasn't set up properly during band changes. It may have been left ON on the new

band in some cases.

* PA TEMP and FP TEMP are now "normal" VFO B alternate display modes, meaning that you don't have to set TECH MD to ON in the config menu.

* DDS frequency shifting during T/R changed to eliminate a variation in CW keying duty cycle that was occurring only over specific, narrow frequency ranges on each band. This also eliminated a related CW keying artifact.

For software developers:

* RG\$ command implemented (sub receiver RF gain).

* "FA", "UP", "DN", ÒRCÓ, ÒRUÓ, and ÒRDÓ COMMANDS UPDATE VFO B IF VFOS ARE LINKED (except in SPLIT). These commands can also be used in transmit mode.

MCU 2.23, 7-31-08

*LSB/USB TRANSMIT EQUALIZATION (experimental): Improved gain balance between LSB and USB. A 1 to 3 dB difference between the two had been reported with the 2.7 kHz (5-pole) filter. The passband should also be slightly flatter.

* ESSB (EXTENDED SINGLE SIDEBAND) ADDED: Allows the K3 to transmit in SSB modes at a bandwidth of up to about 4 kHz. Requires a 6 kHz crystal filter on the RF board. Note: ESSB receive is obtained just by adjusting the WIDTH control.

To enable ESSB transmit:

(1) Make sure the 6 kHz filter is configured correctly for AM transmit; switch to AM mode, then specify this filter using CONFIG:FLTX AM. (A future firmware release should allow use of the FM filter for SSB as well, pending lab tests.)

(2) Locate CONFIG:TX ESSB. Select the desired extended bandwidth for SSB transmit (3.0 to 4.0 kHz) using VFO A. Then tap '1' on the keypad to turn ESSB on/off. When on, the $\hat{O}+\hat{O}$ icon in the mode area will turn on. (If you turn ESSB on/off frequently, you might want to assign the TX ESSB menu entry to a programmable function switch.)

MCU 2.22, 7-29-08

* CHANNEL SCAN no longer locks out small encoders (during scan or after stopping it).

* USER-DEFINED \hat{O} NORM \hat{O} VALUES are now referred to as NORM1/2 rather than ALT1/2

to avoid confusion with the \hat{O} ALT \hat{O} switch, which is unrelated to NORM.

* FLASH MEMORY INITIALIZATION corrected to prevent spurious \hat{O} FPPF LOAD

PENDING \hat{O} message. If this message does appear unexpectedly, tap any switch to see the flash read exception code, e.g. \hat{O} FPPF 1 \hat{O} . Report this to customer support.

MCU 2.20 / DSP1.88, 7-24-08

* AGC: Slope is now approximately linear in dB. Threshold moved about 10 dB lower, closely matching earlier DSP revisions.

* NR: Gain levels re-balanced to account for changes to AGC.

* USER INTERFACE: Minor clean-up of menu entry text and parameters, help text, error messages, etc., to make operation more intuitive.

* SUB RX ON/OFF now has no effect on SPLIT, RIT, or XIT.

* SUB RX SYNTHESIZER is no longer updated when sub RX is turned off, even with VFOs linked. This prevents an audio artifact when tuning. Also eliminated interaction between main and sub synthesizers during T-R switching that was causing keying artifacts at very specific frequencies on some bands.

* IIR DSP FILTER ON/OFF SELECTION now applies to both main and sub receivers. (IIR filter on/off is selected by tapping the '7' switch while in the FLx BW menu entry. IIR filters apply only to 100 Hz and narrower DSP bandwidths. They have slightly more ringing than the default FIR filters.)

MCU 2.16, 7-9-08

* SUB RCVR AUX ANT SELECTIONS: The ANT=ATU and ANT=BNC selections were

reversed. You may need to set this up again (CONFIG:KXV3).

* SUB RCVR CONTROLS LINKED TO MAIN RCVR WHEN VFO IND=NO: BAND, PRE, ATTN, NB, NR, NOTCH. Attempting to change these (using BSET)

results in "=MAIN" flashed on VFO B. Once we allow VFO IND=YES, these controls will have individual settings in BSET mode.

* SUB RCVR NB/NR/NOTCH WORKING: Setting up any of these functions for

the main receiver sets them up for the sub receiver as well.

* RIT/XIT OFFSET NOT CLEARED WHEN SUB RCVR TURNED ON.

MCU 2.15, 7-8-08

* SYNTH TUNING CORRECTED ON 80 M: Downward tuning was sometimes leading to loss of receive and/or transmit at certain frequencies.

* SYNC DATA: Selecting sync data or Ò-SÓ (CONFIG:SYNC DT, used to minimize

the error rate of AMTOR, PACTOR, ARQ, and similar modes) now ensures that the

same crystal filter will be used for both RX and TX (either 2.7 or 2.8 kHz). While -S

is in effect, the receive crystal cannot be changed with XFIL, and SHIFT/LOCUT/HICUT

are unavailable. WIDTH can still be changed, but it will affect only the DSP IF, not

the crystal filter. The RX and TX 1st I.F.s will thus remain identical.

MCU 2.14, 7-4-08

* MEMORY RECALL ON 6 M (CW REV, etc.): Corrected problem with recall of CW normal/reverse and other parameters on 6 meters only.

* 50 AND 100 HZ bandwidths are now available in DATA A (for use with PSK31 and other narrow modes).

MCU 2.13 / DSP 1.83, 7-3-08

New Features:

* MEMORY ERASE: During memory recall or store, tapping CLR erases the present numbered memory (00-99) and flashes "ERASED". You can rotate VFO A to select and then erase any number of memories.

* POWER-UP KEY/PTT PROTECTION: If any external device attempts to key

the transmitter within 2 seconds of power-up, "ERR KEY" or "ERR PTT" will be shown on the VFO B display, and transmit will be inhibited. This applies to KEY IN, DOT, DASH, PTT, vox, or computer-initiated transmit (TX or KY commands). It should prevent accidental transmit during power-on when a computer, keyer, or other device is powered-up at the same time as the K3. Once all keying/PTT/vox activity has stopped, the message disappears, and normal transmit activity can be resumed.

Miscellaneous:

* RATE, FINE, and COARSE VFO tuning controls are all now saved per-mode rather than per-band/per-memory.

* ANTENNA CONTROLS are all now saved per-band, not per-memory. These include:

- Main RX/TX antenna selection (1 or 2)
- Sub RX antenna selection (MAIN or AUX)
- RX ANT in/out selection

- Preamp/attenuator settings for RX ANT ON and RX ANT OFF
- DIGOUT1 menu parameter setting for ANT1 and ANT2
- * PTT RLS MENU ENTRY (PTT release delay). This menu entry allows the operator to specify a delay from release of PTT to exit from transmit in voice and audio data modes. Not applicable to CW, FSK-D, or PSK-D. The default is 0. A higher value may be needed in ARQ and similar data modes, where the transmit DSP pipeline must be fully processed before the carrier is dropped.
- * NARROW CW/DATA FILTERS (100/50 Hz): Corrected distortion and loss issues.
- * SYNTHESIZER: VCO CAL improvements related to ERR VCO and ERR PL1 error messages.

For software developers:

- * '\$' character in CAT commands targets the sub receiver. At present only the AG\$ command is implemented (sub AF gain, e.g. AG\$; AG\$050;).
- * "FI" command provides last four digits of the K3's exact I.F. center frequency, in Hz.

For example, if the selected filter has an offset of 0.00 and is not shifted, the I.F. is exactly 8215000, and FI; will return FI5000;.

- * "MD" COMMAND DURING TUNE: For the duration of TUNE, the MD command will return the operating mode that was in effect at the time TUNE was activated, not CW mode. This should fix a problem with third-party panadapters that may have seen TUNE as a mode change to CW.

Sub receiver:

- * KRX3 MENU ENTRY: Settings now include NOT INST, ANT=BNC, ANT=ATU. When the sub receiver is installed, the operator must select one of the two ANT settings based on what is connected to the KRX3's AUX RF input: the KAT3's non-transmit antenna (ANT=ATU) or the rear-panel AUX RF BNC jack (ANT=BNC).

* BSET-MODE ANT1/2 ICONS: When the sub receiver turned on, you can use BSET mode

to view or change the sub's antenna assignment: MAIN (sharing the main receiver's

antenna) or AUX (using the sub's AUX RF input). When AUX is selected, the ANT1/2 icons

will either turn off (if ANT=BNC was specified for in the KRX3 menu entry) or one of

them will be on (if ANT=ATU was specified).

* SUB RX FILTER SETUP: In menus, toggling between RF and SUB and switching

filters or modes now properly sets up sub if applicable. This allows the operator to hear

the effect of any changes on the sub receiver's own filters (if SUB AF GAIN is set

so it can be heard). NOTE: You must turn the sub receiver ON before entering the

menu if you want to listen to the sub during filter changes.

MCU 2.10 / DSP 1.81, 6-22-08

* SYNTHESIZER OCCASIONAL RX/TX DROP-OUTS FIXED.

* SYNTHESIZER BANDSWITCHING DELAY increased to allow VCO more time to lock.

* TX/RX switching time improvement in DATA-S mode.

* NARROW FIR FILTERS: Gain balanced (CW and data modes).

* NOISE BLANKER can now be used with AGC turned off in all modes.

* DENOISER: Gain balance improved in SSB/AM modes.

MCU 2.03 / DSP 1.78, 6-9-08

Misc:

* EXT ALC voltages adjusted to match resistors called out in EXT ALC mod document.

PC Control Command Changes (for application software developers):

* "PC" (PWR READ) IN K22 MODE now supplies correct value for QRO (KPA3) on/off.

* ÒFA/FBÓ BAND CHANGE now saves mode for old band before switching to new band.

This prevents problems with per-mode bandwidth, etc., following band changes.

* ÒMDÓ COMMAND FIXED: On 6 m, CW norm/reverse were being reported backwards.

On all bands, DATA A and PSK-D were reversed for both get and set (AFSK A and

FSK-D were correct). **NOTES:** When an ÒMDÓ command is used to switch between

data normal and reverse, it applies to *both* DATA A and PSK-D (if either of these was

in effect), or AFSK A and FSK-D (if either of these was in effect). To get/set data

modes, use ÒSWH43;Ó to emulate pressing the DATA MD switch, then ÒDBÓ to retrieve

the data mode text string from VFO B, and ÒUPB;Ó / ÒDNB;Ó to change the mode.

MCU 2.02, 6-7-08

* VOX SWITCH NOW FUNCTIONS CORRECTLY IN CW MODE. When VOX is OFF in

CW mode, transmit must be enabled via XMIT or PTT rather than just hitting the key.

* MEMORY-BASED CHANNEL HOPPING (for 60 m in particular): This now works

as described in the K3 Owner's Manual (rev C., page 37). You can manually 'hop'

with VFO A, or scan channels. First, store the desired channels in *adjacent* memories.

For example, you might set up 60-m channels in memories 61-65 (5330.5 kHz, etc.).

Next, change the first label character in each of these memories to an asterisk (*) as

described in the manual. (The first memory *above* and *below* your channel-hop group

must either have no asterisk in their first label position, or be on different bands.)

Finally, tap M->V and select any one of these memories. Manual rotation of VFO A

and scanning will then use only the memories in the group. To return to normal operation,

use any of the VFO rate switches, or change bands. NOTE: A future revision will allow

FM channel hopping based on squelch activity.

SCANNING TIP: On a noisy band, scanning may pause too often. Try using a narrower

filter, turning the preamp off, or backing down RF GAIN until the scan starts.

MCU 2.00 / DSP 1.77, 6-6-08

* BAND DATA FOR TRANSVERTERS: The BAND0-3 outputs on the 15-pin ACC jack

can now be used to control transverters as described in the Owner's Manual (revision

C, page 18-19). To enable this feature, set *CONFIG:KIO3* to HF-TRN (which outputs

band decode data for both HF and transverter bands) or TRN (transverter band data only). The default is NOR (HF band decodes only).

* CW MODE SPEAKER ARTIFACT ELIMINATED: Some operators reported a periodic burst of noise coming from the speaker when headphones were used in CW mode. This has been corrected.

* MIC BUTTON FUNCTIONS DEFAULT TO OFF: There's now a menu entry for

turning the mic up/down buttons on or off (*CONFIG:MIC BTN*). The default is OFF,

which makes these buttons inactive. You should turn it ON only if you have a mic whose up/down buttons provide contact closures to ground, with no resistors in series or in parallel (such as a Kenwood MC-43). Some mics have internal resistors and are not compatible with the K3's up/down feature. If you try to use such a mic (by setting *CONFIG:MIC BTN* to ON), VFO A may scan continuously.

MCU 1.99 / DSP 1.76, 6-4-08

New Features & Misc. Changes:

* POWER LOSS DURING TRANSMIT ON 6 M CORRECTED.

* RIT APPLIES TO BOTH VFOs WHEN LINKED. With the sub receiver installed,

this allows diversity receive tuning via RIT while preserving a fixed transmit frequency.

* ANTIVOX GAIN increased. (Some antivox users may need to use a lower setting.)

* MIC UP/DOWN buttons, if provided on your mic, will move VFO A up or down one

unit at the present tuning rate. Holding the UP or DOWN buttons for about 1 second

will auto-repeat the VFO movement, allowing manual scanning of the current band.

* PER-BAND POWER CONTROL: This feature is very useful with external amplifiers

as well as transverters. To use it, change *CONFIG:PWR SET* to PER-BAND.

* RECEIVE RFI DETECTION: If the *CONFIG:RFI DET* menu entry is set to NOR (normal), the K3 will detect the presence of very large signals (about 2 watts or

higher) that appear at the ANT1/2 jacks *in receive mode*. ÒHI RFIÓ will be displayed

on VFO B. Try separating antennas, using single-band filters, or reducing power.

To disable RFI detection, set *CONFIG:RFI DET* to OFF (not recommended).

* EXTERNAL ALC: We strongly recommend that external ALC only be used to protect

your amplifier during operation into a failed load or other serious condition. In fact, most

amplifiers have such protection built in, and do not need or specify the use of ALC.

ALC should not be used as a way to clip or compress fast voice peaks.
The K3's

ALC uses a moderate attack time specifically to prevent signal distortion due to ALC

action, so it is the responsibility of the operator to keep drive below this level.

DO NOT SET THE K3's POWER LEVEL TO MAX AND ADJUST AMP OUTPUT USING

THE AMP's ALC CONTROL. THIS WILL RESULT IN SPLATTER AND KEY CLICKS.

INSTEAD, ADJUST THE DRIVE ON EACH BAND SO IT'S JUST BELOW THE LEVEL

WHERE ALC STARTS TO ACTIVATE. (See Per-Band Power Control, above.)

NOTE: You may need to make some simple modifications to the transceiver to use

external ALC. This information will be added to our K3 mods page. Information for

specific amplifiers will be made available when possible.

Once the mods have been made, set *CONFIG:EXT ALC* to ON by tapping '1'. (6 m can be

turned on/off separately from HF.) The default external ALC threshold of **-4.0V** will work

in most cases, but can be changed if required. If your amplifier's gain varies from band

to band, you may want to set *CONFIG:PWR SET* to PER-BAND. You can then adjust

the drive ideally on each band to prevent external ALC activation during normal operation.

If you select CMP/ALC metering, external ALC activity is indicated by 8 or more bars.

If you select SWR/RF metering, the CMP/ALC meter icons will flash during external ALC

activity to make you aware of the condition. Reduce the drive power if this occurs.

PC Control Command Changes (for application software developers):

* BAND CHANGES RESULTING FROM FA/FB commands now run to completion before

any additional commands are processed (such as MD or FW). This should prevent

errors in mode or filter settings which sometimes occurred with older K3 firmware.

Band changes take approximately 0.5 seconds to complete.

* FA/FB COMMANDS TARGETING 6 METERS will select a 6 m transverter if available.

If not, these commands will select the K3's internal 6 m band.

- * FW (filter bandwidth) command fully implemented. If K3 extended command mode is

in effect (OK31;Ó), FW sets or reads bandwidth in 10-Hz increments.

- * DS (VFO A/icon read) now reports a number of K3-specific icon states, including

RX ANT, SUB, etc. See K3 Programmer's Reference, revision B2 or later.

MCU 1.96, 5-14-08

- * NEW VFO COARSE TUNING RATES: FM, 10 kHz; CW, 0.1 kHz; SSB, 0.1 kHz.

- * SQUELCH ASSIGNED TO SUB RF/SQL now persists across a power cycle.

(This is done using CONFIG:SQ MAIN; set it to Ò=SUB POTÓ.)

- * XVn ON menu entry, when assigned to a programmable function switch, will now alternate between YES and NO. This now applies to all 2-valued menu entries.

- * Flash and EEPROM memory read/write are now verified to improve reliability of parameter storage. This includes PLL data tables, frequency memories, etc.

MCU 1.94 / DSP 1.73, 5-12-08

- * VOX: Increased sensitivity. Typical VOX GN settings now ~30-50.

- * VOICE MONITOR: Eliminated ÒscratchyÓ artifacts with compression set to high levels.

- * FM DEVIATION ADJUSTABLE: Use *CONFIG:FM DEV* menu entry (default: 5.0 kHz).

- * Flash memory driver improved to prevent occasional receive dropouts, ÒERR PL1Ó, and

ÒFPPF LOAD PENDINGÓ messages.

- * XMIT SWITCH IN MENU: Tapping XMIT while in menu correctly starts/ends transmit.

- * PASSBAND SHIFT BELOW Ò0.00Ó CORRECTED: The SHIFT control no longer allows

continued rotation below 0.00. (This was occurring only with sidetone pitch < 500 Hz.)

- * SQUELCH/RF GAIN CONTROL CHANGES: By default, the RF/SQL concentric pots

control main and subreceiver RF gain, and squelch is controlled by two CONFIG menu

entries (SQ MAIN and SQ SUB). But setting SQ MAIN to "=SUB POT" assigns SUB RF/SQ pot to both main and sub squelch, and in this case, the main RF/SQ

pot controls both main and sub RF gain. Setting SQ MAIN back to a numeric value

restores the default assignments. **Note:** Squelch applies only to FM mode at present.

- * USE LAST SEGMENT OF S-METER (S9+60) IF NOT IN SMTR PK MODE.

- * USE TEXT DEC THRESHOLD FOR AUTO-SPOT.

- * SMOOTHED OUT NOISY CWT REPRESENTATION DURING CW COPY.

MCU 1.88 / DSP 1.70, 5-4-08

- * *CONFIG:XVn PWR* menu entry now correctly sets the power range upper limit for

the associated transverter band; the PWR control can be used to reduce this level.

Also, the max limit for each transverter band is now enforced on band change.

- * MIC AND LINE IN GAIN: Resolution improved; higher settings will be required as a result.

- * FM DEVIATION corrected (now 3 kHz). In DSP rev 1.69 it was set too high. Eventually it will be adjustable.

- * AFX ÒBINÓ mode no longer causes SSB TX distortion or CW RX distortion.

- * *CONFIG:TXG VCE* menu entry is now working. If your peak power in voice modes

is too low compared to the PWR knob setting, use a higher *TXG VCE* value.

However, if you have an amplifier connected, watch it's meter for excessive voice peaks, and reduce the PWR setting accordingly. (Also see comments about SSB POWER CONTROL in previous firmware release.)

MCU 1.87 / DSP 1.69, 5-3-08

This release includes improvements in all areas. Changes are categorized below.

NEW FEATURES:

* CW KEYING IN SSB MODES: While in SSB modes, you can now send CW without

changing modes or using an offset. The other station will hear the signal at your CW pitch.

This is especially useful on VHF bands when SSB signals can't be copied.

To enable this feature, go into *CONFIG:CW WGHT* and tap '1' until you see SSB +CW.

* FM MODE ADDED: Requires **FM filter** installed in slot **FL1**. The bandwidth for FL1

must be set to **13.0 kHz**. FL1 must also be set to ON for FM mode. Those not needing

FM mode can set *CONFIG:FM MODE* to OFF. **To set up a repeater offset:** Use the

CONFIG:RPT OFS menu entry, then hold ALT to select -/+ /simplex (-/+ appear under

the FM mode icon). **To set up tone encode:** hold PITCH, then rotate VFO B to select

PL TONE or PL OFF, and rotate VFO A to select the desired CTCSS tone. (When

PL TONE is on, a letter 'T' will appear near the FM mode icon.) Repeater offsets and

PL tones are stored per-band/per-memory.

* VARIABLE AMP KEYING DELAY: Added *CONFIG:TX DLY* menu entry, which

sets the time from KEY OUT jack (active low) to first RF in 1-ms steps, from 8 to 20 ms.

To minimize loss of QSK speed, use the *shortest* delay that works with your amp.

Most will work with the default (minimum) setting of 8 ms.

* LINE OUT ALLOWS RX/TX AUDIO RECORDING: Normally, *CONFIG:LIN OUT* sets a

fixed-level, receive-only output for main/sub (L/R), compatible with digital modes. Tapping

'1' switches *LIN OUT* to =PHONES, where the line outputs match headphone audio,

audio level controlled by AF/SUB gain controls, and both RX and TX audio available.

* **SIMULTANEOUS USE OF MIC AND LINE IN:** If the *MAIN:MIC+LIN* menu entry is set to

ON, and *MIC SEL* = FP or RP, the present mic OR line in can be used for transmit audio.

NOTE: Setting *MIC SEL* to LINE overrides the *MIC+LIN* menu entry (its parameter

becomes "N-A"). When MIC+LIN is in effect, rotating the MIC control shows MIC GAIN.

The op has to set *MIC SEL* to LINE temporarily to set LINE IN gain.

* **S-METER ABSOLUTE MODE:** Use the *CONFIG:SMTR MD* menu entry. Set to ABS

(absolute) to have S-meter stay constant with preamp/atten settings. Default is NOR (where

PRE/ATTN affect the S-meter). **ABS mode** requires recalibration (*SMTR OF* & *SMTR SC*).

RECEIVE:

* **SSB RECEIVE PASSBAND EXTENDED AT LOW END** (now 100 Hz; was 200 Hz).

* **AM RECEIVE WIDTH RANGE INCREASED:** The WIDTH control in AM mode now has

a range of 2.8 to 10.0 kHz. Wider settings provide outstanding fidelity for hi-fi speech

and other wide-band signals. This is the *IF* filter bandwidth -- the traditional way to show

bandwidth for AM, because the required IF bandwidth is twice the modulation bandwidth.

NORM selects an IF bandwidth of 6.0 kHz in this mode. WIDTH settings above 6.0 kHz

will not be useful unless you have an FM-bandwidth crystal filter installed (at FL1).

* IF A 2.8 KHZ FILTER IS INSTALLED, SSB "NORM" BW is 2.8 kHz (was fixed at 2.7 kHz).

* **AUTO-SPOT** (SPOT with CWT ON) now works with both very weak and very strong signals.

* PSK AUTOTUNE ACCURACY improved. You may still need to use RIT (FINE steps) to

tune in signals for best built-in text decode. (Also see CW-to-DATA in the Owner's Manual.)

TRANSMIT:

* TRANSVERTER POWER CONTROL: The value set in CONFIG:XVn PWR now correctly

sets a fixed power level on the associated transverter band (0-1.50 mW or 0-12W).

* POWER ROLLBACK BASED ON REFLECTED POWER: Power rollback begins at about

2.5:1 at 100 W (and of course much higher SWRs are tolerated at lower power settings).

Recovers to original target power level after mismatch is corrected.

* CW QSK further refined, with smoother mute/unmute in the presence of QRN and QRM.

* SSB TRANSMIT BANDPASS EXTENDED AT LOW END. Improvement is about 2 dB

at 300 Hz, 3 dB at 200 Hz, and 6 dB at 100 Hz. Additional improvement possible via TX EQ.

* SSB TX POWER CONTROL improved. Set ALC for about 5 bars (rarely 6+) using MIC gain

control, then set CMP and POWER as desired. **The RF power bargraph shows approx.**

peak power when you whistle or shout, but will typically show well below peak power

during normal speech. If you're using an external peak-reading wattmeter or power

amplifier, adjust POWER as required while observing the effect of speech peaks.

If you find that an SSB power setting higher or lower than for CW is often required,

you may wish to compensate for this using the *CONFIG:TXG VCE* menu entry.

Technical Note: Our latest MCU and DSP code uses minimal amounts of ALC, consistent

with analysis done by Leif Asbrink, SM5BSZ. (His findings and recommendations can be

found on his web site, .) The general idea is to keep

transmit drive just *below* where ALC can cause splatter on speech peaks, rather than

apply ALC heavily to achieve additional compression.

CONTROLS:

* A->B SWITCH: 1st tap copies frequency only; 2nd tap within 2 seconds copies mode

and filter settings.

* VFO LOCK is no longer cancelled by VFO tuning controls (RATE, FINE, or COARSE).

* TUNING EITHER VFO ACROSS MULTIPLE BANDS now brings the other VFO along

with it, so that both VFOs will always be on the same band. This eliminates the problem

of bands getting out of sequence due to wide tuning excursions. (Later, we'll allow the

subreceiver to be on a different band from main if *CONFIG:VFO IND* is enabled.)

MCU 1.78, 3-18-09

* SPOT now usable in REF CAL menu entry.

MCU 1.77 / DSP 1.58, 3-12-08

* SSB TX power overshoot corrected.

* DUAL-PASSBAND CW now working correctly (was acting like a single-BW 150-Hz filter).

MCU 1.76 / DSP 1.58, 3-11-08

* TX power output spikes eliminated (may still get slight overrange with high CMP

settings -- a fraction of a dB).

* "Dead RX" on band change, etc., fixed (hopefully).

* DUAL PB CW working (had been lost a few revisions back due to unrelated DSP change).

* SQUELCH control added (SUB RF/SQL knob). Applies to both receivers.

* RX/TX EQ bin 6 now labeled 1.6 kHz per spec (was incorrectly labeled 1.2 kHz).

* MIC BIAS factory default is OFF.

MCU 1.75 / DSP 1.57, 3-4-08

*** SSB TRANSMIT Improvements:**

This is the first phase of our effort to make SSB transmit setup and use more consistent

with operator expectaions. Changes so far include:

- Higher signal-to-noise ratio at both mic jacks, as well as LINE IN
- Livelier and easier to use transmit-mode metering (CMP, ALC, SWR, POWER)
- Better optimized TX EQ menu function
- More effective compression (CMP)
- Greatly reduced distortion with CMP set to 0 (for audio data modes, high-fidelity

speech, and two-tone testing with an external audio generator)

(Planned for next release: Improved low-frequency response and adjustable TX passband.)

Note on MIC gain setup: To properly adjust MIC gain, first set CMP to 0, then adjust

MIC gain for about 5 bars on the ALC meter (it should not hit 6 bars during normal speech).

Then set CMP for the desired compression amount.

*** 2 USER-DEFINED "NORM" filter setups for each mode:**

Now, in addition to the K3's "NORM" values, you can save two of your own often-used filter

setups in each mode, and recall them using the NORM function. The new NORM values

are named ALT1 and ALT2. **To save a filter setup**, hold NORM until you see "<- SAV ->"

(3 seconds), then rotate the knob left or right to save it as ALT1 or ALT2. (The arrows to the

left and right of "SAV" are a reminder that you can rotate the knob left or right go get to the

"ALTErnate" filter memories.) **To recall**, hold NORM until you see "<- NOR ->" (about

1/2 second), then rotate the knob left or right to recall ALT1 or ALT2. Note: Whenever

you normalize the filter passband via NORM, ALT1, or ALT2, two "wings" appear on the

DSP filter passband graphic. Moving any DSP control makes the wings disappear, as a

reminder that the passband is no longer normlized.

*** DUAL PASSBAND Bandwidth Restore:** On exit from DUAL PB, the previous CW bandwidth

is restored.

MCU 1.73 / DSP 1.56, 3-1-08

*** BETTER MIC JACK S/N RATIO:** This is the first of several changes intended to

improve voice transmit performance. (Other changes are still in the works.) This change

increases the gain ahead of the transmit A/D converter, which should result in lower

quantization noise, especially with mics that have low output. Still experimental.

*** SPEAKER "popping"** eliminated when using headphones and certain combinations of

features (such as NR).

*** VFO LINKING:** Holding the "SUB" switch links/unlinks the two VFOs. When linked,

VFO A is the master; turning it moves both VFOs the same amount. VFO B can be

set to the same frequency by tapping A>B, or it can be offset a fixed amount from VFO A.

Setting them to the same frequency will permit diversity receive with the subreceiver.

*** LOCUT/HICUT CONTROL RANGE:** DSP controls are better behaved, preventing

"wrap-around" and other reported anomalies.

*** Tapping A>B in SPLIT mode** now updates the filter settings correctly.

MCU 1.70, 2-20-08

* [#94] ATU MATCHING IMPROVED: If operator taps ATU TUNE a second time on the same

band/antenna within 5 seconds, a more extensive search is used. Dramatically improved

performance in tests with some high-Q (narrow-band) loads. Original (fast) algorithm

is unchanged.

* [#243] RIT/XIT OFFSET DISPLAY MODE ADDED (right after date, before voltage). This is

especially useful with CW-to-PSK31, where the operator may be quite conscious of the

required RIT offset, or for those using RIT during contesting.

* [#322] RTTY CWT INDICATOR UNSTUCK (was getting stuck when PITCH was accessed).

* [#275] Tapping XMIT during CW message playback both stops the message *and* exits

transmit mode.

* [#199] SSB filter BW steps now 100 Hz up to 3 kHz, then 200 Hz.

* [#292] NON-VOX CW no longer has any delay after transmit termination (i.e., release of

PTT or exit from XMIT).

* [#236] Switching of antennas during tune is not allowed (this was fixed some time ago).

* [#285] Tapping transmit-related multifunction encoders briefly displays the present parameter

value (SPEED/MIC/CMP/PWR). Double-tap to display the existing parameter (since this

switches first to the alternate, then back).

* [#305] Tapping filter-related multifunction function encoders briefly displays the present

parameter value (SHIFT/LOCUT/HICUT/WIDTH). Double-tap to display the existing parameter.

* TRANSMIT BLOCKED from 7.500 to 8.999 MHz (to prevent possible damage to the

KAT3/KANT3 traps). This range is blocked even if the customer has unblocked transmit using

our software "MARS enable" utility. It is only usable in milliwatt-power mode (KXV3).

MCU 1.69, 2-18-08

- * Fixed problem with CW transmit via the KEY jack, where short-duration noise pulses

or very fast CW could result an incorrect synthesizer frequency on return to receive.

MCU 1.68/DSP 1.53/DTBL0008, 1-30-08

- * CW-to-PSK transmit added. It works, but now that QSOs are possible in this mode,

we need to look into the +10 to +16 Hz receive offset reported by users.

- * "UP" and "DN" remote control commands now work for parameter setup, such as NB,

TEXT DEC, DATA MD, NR ADJ, etc. Adding 'B' (e.g., "UPB;", "DNB;") controls the

VFO B parameter; otherwise, the VFO A parameter is controlled.

- * DATA MODE selection is now stored per-band, per-memory.

- * MIC Source is now independent for voice/data modes. See micCtrlVoice, micCtrlData.

- * Milliwatt power display now correctly shows "-9.0" dB between -8 and -10.

- * Synthesizer control improvements (eliminated some ERR VCO cases during VCO CAL,

as well as 30-m transmit problems).

MCU 1.66, 1-29-08

- * CORRECTED ATU TUNE PROBLEM: In version 1.65, tapping ATU TUN would use the value

set in the new TUN PWR menu entry, and afterward set the power knob to the TUN PWR value.

The ATU TUNE power level is supposed to be fixed (5W and 10W, automatically controlled).

It should not be affected by either the TUN PWR menu entry or the power knob.

MCU 1.65 and DSP 1.52, 1-28-08

- * TUNE POWER level menu entry (TUN PWR). This determines the power level used

when the TUNE switch is pressed. The default, "NOR", uses the power knob setting.

Alternatively, the value can be set to any power level from 0.1-120 W.

* REAL-TIME-CLOCK display now keeps accurate time. The RTC IC itself was running

accurately, but the VFO B time display was running about 9% slow.

* MODE SWITCH now only cycles through one sideband (LSB or USB) on each band --

not both. Saves time when switching modes, especially useful in contest situations.

Use the ALT switch (hold the left end of MODE) to switch between LSB and USB (per-band).

NOTE: As a result of this change, you may need to re-select the desired sideband on

some bands. You'll only have to do this once.

* S-METER ACCURACY Improved. Suggest using SMTR SC=14 and SMTR OF=24

(these are the normal defaults).

* EXTERNAL CW TIMING IMPROVED: Corrected rise/fall time asymmetry. Internal

and external keyers should now be closely matched in weighting.

NOTE: You may need to reduce the weight of external keying, if you had increased

it to compensate.

* AMTOR RX/TX turnaround times improved. To do this, we've created a variation of

SSB and DATA modes called SYNC DATA. It should only be used with modes like

AMTOR that require the fastest possible turnaround time. To turn on SYNC DATA, first

locate the SYNC DT menu entry (SYNC DATA), and assign it to any programmable

function switch (PF1, PF2, M1 tap or hold, M2 tap or hold, etc.). Then use this programmable switch to enable SYNC DATA. The -S mode icon appears. This setup

can be enabled separately for SSB or DATA modes. (The actual turnaround times will vary with crystal filter selection. Further improvements may be possible and are being explored.)